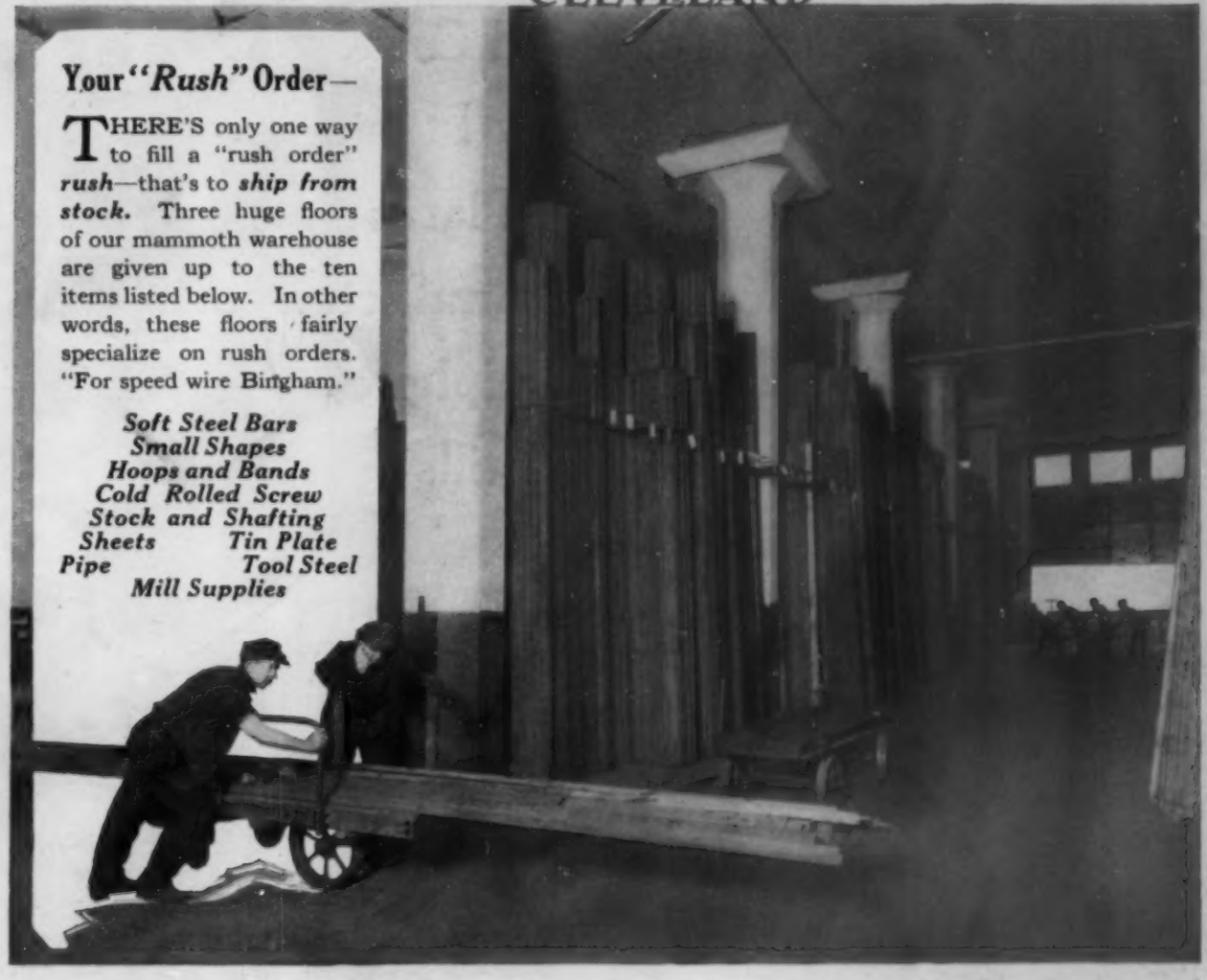
In This Issue.—A Comparison of the Metal Resources of the Allied Powers and the Central Empires

THE IRON TRADE REVIEW

Single Copies 15 Cents | CLEVELAND, APRIL 12, 1917 | Four Dollars a Year

The W. Bingham Co

CLEVELAND


Your "Rush" Order—
THERE'S only one way to fill a "rush order" rush—that's to ship from stock. Three huge floors of our mammoth warehouse are given up to the ten items listed below. In other words, these floors fairly specialize on rush orders. "For speed wire Bingham."
Soft Steel Bars
Small Shapes
Hoops and Bands
Cold Rolled Screw Stock and Shafting
Sheets
Tin Plate
Pipe
Tool Steel
Mill Supplies

STEEL

The W. Bingham Co

1841 1917

WHOLESALE HARDWARE
FACTORY MINE AND RAILROAD SUPPLIES
CLEVELAND

STEEL

Alphabetical list of Advertisers, pages 172-173. Table of Contents, page 55. "Where-to-Buy," page 122. Opportunities, pages 165-166.
Engineering Directory, pages 156-157. Second-Hand Machinery, pages 167-168-169. Fill-in and Contract Work, pages 170-171.

H. KOPPERS COMPANY

Builders of

By-Product Coke and Gas Ovens
Benzol Recovery Plants
Tar Distilling Plants
Direct Process for Manufacture of Ammonium Sulphate
Ammonia Stills

CONSULTING ENGINEERS

on the operation of

By-Product Coke Plants and Auxiliaries

FIRST NATIONAL BANK BUILDING
PITTSBURGH, PA.

THE IRON TRADE REVIEW

Vol. LX Cleveland, April 12, 1917 No. 15

Patriotism Sweeps Over Industry

Steel Makers Rising to Highest Duty of Cooperation and Unified Effort In Behalf of Nation—Large Concessions Made In Plates, Shapes and Bars

A SPIRIT of patriotic service has enveloped the iron and steel industry and at this time all other considerations have been subordinated to it. Buyers as well as sellers rapidly are squaring themselves to the new condition whereby priority of the government in everything that the industry affords is being given full recognition and is being accepted with a determination to consolidate most effectively the nation's potential power against a formidable foe. Personal as well as corporate service freely is being tendered and is being utilized.

Fix Prices to Government

The fixing by the steelmakers with the government of agreed prices of 2.90c for plates and of 2.50c for structural shapes and steel bars has opened the mills to the receipt for the quickest possible rolling of a large tonnage of miscellaneous war requirements for both the army and the navy. These figures represent a tremendous concession, which can be appraised adequately only by comparison with the prices at which clamorous buyers, including other belligerents, have been glad to pay for deliveries approaching even remotely those with which the government is to be favored. Prevailing quotations on steel-making pig iron also supply a market measure of these reductions. Operating schedules swiftly have been arranged to give government material a clear right of way. In various products, the position on mill books of consumers, which after many months had reached the rolling stage, has been displaced. These effects are widely distributed and are causing considerable inconvenience and unsettlement of plans. The distribution problems of the producers, already severe, have been rendered more acute by this condition. Whatever disturbances that have appeared in this direction, however, are being met in a spirit of vigorous team work.

Market Effects

The ultimate effects on the general market conditions in steel of the presence of the government as a supreme buyer remain to be shown much more clearly by what the future will demand in tonnage and in deliveries. That they will be widely diffused, the past week's developments indicate. New buying has been further limited by the unwillingness of producers to accept new business until the government has had an opportunity to express its wants. In practically every line, evidence of these ramified needs are appearing extending from tin plate for food containers for the army and navy to ship materials and raw steel for munitions. Pittsburgh reports a 10,000-ton inquiry for shell steel. In the east government plant extensions loom large. Despite the interference of war needs with the regular conduct of business, finished steel conditions generally remain strong with an upward tendency of prices.

Pig Iron

Pig iron, yet unaffected directly by war influences, is sweeping on. Buying for the more extended future has been moving westward. Prices again have advanced generally. In Pittsburgh, valley and lake districts there has been something of a spurt under a fresh demand for this year and as a result of recent selling for next year on a scale which had not been disclosed previously. Some makers along the lakes have booked such business in malleable and foundry that 50 per cent of their output for the first half of 1918 now is under contract. Various automobile builders at Detroit have bought actively for next year and still are figuring. Northern foundry and malleable more readily commands $40, furnace, for this year, with $38 for next year more freely quoted. One Alabama interest has resumed selling at $35, Birmingham, after July. Basic has grown scarce and some consumers who still have to buy for this year are facing a problem. A middle western steelmaker seeking 20,000 tons was able to obtain only about half of this amount. Early basic has sold at $38 and even $40, valley, the former price being done on one lot of 5,000 tons. For last half, $35 was paid on a good tonnage. Bessemer also is scarce and has brought $42. As high as $45 valley, has been quoted. Buying in the east has been less vigorous, but prices still are buoyant.

THE OPEN HEARTH

Doing Its Bit Literally

OF ALL the ill-chosen and unjust remarks of those members of congress who, voting against the government during the recent crisis, sought to cover an unrighteous act with the pretense of principle, the statement that the war with Germany has been brought about by munition makers, is most grotesque. The week's developments, which have seen the steelmakers tender the government greatly reduced prices on essential materials as their contribution of substantial patriotism, peculiarly emphasizes the ridiculous aspect of such statements. Were the charge not susceptible to such unfair impressions by the general public, a declaration to this effect could be passed as silly or excused as a mark of ignorance.

The term munition maker must and does include the steel manufacturer. The largest and most important branch of the making of shells is the steel that goes into them. The metal itself is the root of the business. It is, of course, patent that the American iron and steel industry has profited greatly as a result of the war. The one matter of doubt is whether it has profited most from the direct or indirect forces turned loose by the dislocation of normal trade throughout the world. Prices in many lines for commercial purposes are much above those at which war steel is being delivered abroad. In some materials they are far above the highest prices for shell steel for export now on makers' books. There is practically a place for every pound of steel that can be produced and the manufacturer who may have any unengaged tonnage before many months in the future may count himself lucky. On anything he is able to offer within a few months, he is able practically to dictate his own price. To all indications, this condition of trade bids fair to continue as long as the world's famine in steel, arising from the war, prevails.

Under such circumstances, it is difficult to see how the steel manufacturers of the country could hope to derive profit or benefit from the entrance of their own government into the world-wide maelstrom. The opposite is the truth. The United States in war actually entails a heavy bill of lost profits to the steelmaker. The preferred position which the government occupies as to commanding immediate service in manufacturing for its account and in deliveries with minimum delay, means a displacement of much business with other buyers who are paying many dollars more per ton for their steel. Steel plates which have been selling from 6c to 8c per pound under the agreement just reached are to go to the military authorities in tonnage limited only by necessity at 2.90c per pound. Structural shapes and bars which have been selling in the open market at 3.50c to 4c per pound will be obtained by the government at 2.50c per pound. Emphasis needs to be laid upon the fact that every ton of steel the government will require will force out of position another ton already sold at much higher prices. Furthermore, the uncertainty as to how the war may develop and as to the ultimate extent of the government's requirements will tend to hold back the makers on new sales to the outside trade.

The steelmakers have not made lower prices to the government nor offered their full co-operation as a result of any surplus of capacity. They have no surplus and were not likely to have had any during the duration of the war, even without the United States in the conflict. The steel manufacturers, in common with all other patriotic business men, are freely willing to give the government their whole-souled support in the nation's hour of peril. The country at large should not fail to appreciate what this means under current business conditions. Patriotism should not be measured by dollars. The sum that represents alike the saving to the government and the loss of profits to the steel industry, however, is so huge that it must deeply impress the average mind with the magnitude of the concession and the spirit that created it.

The American Engineer in War

DURING the past 50 years the manufacturers of the United States have had little opportunity to learn from experience the difference between the industrial machinery of peace and war. As pointed out by Edgar Allen Custer Jr., on page 825 of this issue, the methods employed in the average plant cannot be tolerated in the manufacture of the important munitions of war. The warnings issued by Mr. Custer to foundrymen apply equally well to the manufacturers of many materials used in provisioning and maintaining a great army in the field.

Now that the industrial force of the country is directly matched against the much-touted German efficiency, there is a wonderful opportunity for the enthusiasm and ability of the American engineer to assert itself. Accuracy and thoroughness, qualities which have not been developed extensively during the easy-going period of the last decade, must be emphasized by engineers upon the producers of munitions. A little more of discipline and less of indifference to accepted standards will place our industries upon a better martial footing.

Greatest among the requirements of the present emergency is organization. The nation's vast resources are of little value in war until they have been organized properly. It is in the mobilization of the distinct and widely scattered manufacturing units into

THE OPEN HEARTH

a harmonious, efficient machine that the engineer can utilize his training to the greatest advantage. The remarkable records made by a few American munitions makers producing shrapnel for the allies may be taken as an indication of the effectiveness with which the engineering ability of the nation will buckle down to the war game.

Not a Panacea

THE Smith-Hughes bill providing a federal subsidy for vocational training is not without significance and interest to the industrial world. The actual sums to be appropriated are too small to be of great pertinence; the provisions of the bill are far from revolutionary, but still its passage is of importance in that it indicates a movement to replace the supply of artisans formerly provided by apprenticeships in shops. Doubtless the passing of old-school methods of training the youth of the nation in shop craftsmanship is responsible in no small degree for the initiation of the propaganda for vocational training.

The benefits to industry that will be derived from this recent legislation are somewhat problematical. American educators so far appear to have failed to eliminate the confused conditions introduced by the novelty of vocational training combined with the present standards of education. The problem of giving the student an adequate technical training without sacrificing those educational fundamentals so necessary for efficient citizenship is indeed difficult. This co-ordination suggests two evils. If specialized training is carried too far, we run the risk of turning the public school into nothing more than a preparatory school for industry. On the other hand, if the training is made more general to evade the first danger, the student is not well enough equipped to be skillful in any field of endeavor. In either case, the one whom the bill is designed to benefit is the one who suffers. Let us hope, however, that this new legislation will pave the way for a solution of this difficult problem.

War Labor and Scrap

UNPRECEDENTED demand for melting materials has made scrap more than ever before a primary factor in the steel industry. The rise in value of certain grades of old material, as a result of recent market conditions both in new and used steel, has been spectacular. The real phenomenon in the history of man's labors, where a commodity which, when worn out, has possessed a greater value than when it was new, has been presented and repeated in old iron and steel during recent months. Rails which have been scrapped have been sold for more than their original cost. The sale of an old mill with its machinery as scrap has been rendered more profitable than the rebuilding of the plant. Prevailing conditions have been transmuting veritable junk into gold with war as the crucible.

Now the crucible of war may impart a still greater value to the so-called junk of the industry. Throughout the country, a great tonnage of old material has been accumulating, awaiting upon open weather and the men to gather it in for the market. Experienced minds in the scrap trade have predicted that spring would draw labor to this task and direct thousands of tons to the waiting furnaces. The government of the United States has decided it needs men for other purposes. The effect of these drafts upon labor supply may be important. This is especially important in scrap, where the manual effort required in general collection and distribution probably is the largest of any single major detail in the assembling for manufacturing of raw iron and steel material.

Heavy melting steel has sold up to $30 per ton, the highest price in a quarter century. But for duplexing operations, which have accounted for thousands of tons of steelmaking pig iron and little or no scrap, this price, no doubt, long ago would have been surmounted. Should thousands of tons of old material now become tied up by lack of the man power to gather and handle it, the spread between heavy melting steel and basic pig iron and similar discrepancies between other grades of these melting materials may be eliminated. The greater intrinsic worth in units of realizable metal in scrap over the blast furnace product then probably will receive a more adequate market expression.

Turning Swords Into Plowshares

AMERICAN manufacturers who have been busy making munitions during the past two years, now again have the opportunity of turning swords into plowshares, at least so far as European nations are concerned. A Minnesota tractor manufacturing company last week landed contracts for 1,500 of the farm implements, an order worth $1,250,000, the tractors to be used, chiefly by women, in cultivating idle fields in England, France, Russia and Spain. Coming on the heels of the statement of Sir Arthur Lee, head of the newly-formed food production department of England, that the British Isles alone will need at least 2,000 farm tractors at once, this indicates manufacturers who will not be engaged in making munitions for the United States may have several new fields to develop.

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products April 11, average for March, 1917, average for January, 1917, and average for April, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Apr. 11, 1917.	Aver. for Mar., 1917.	Aver. for Jan., 1917.	Aver. for April, 1916.
Bessemer pig iron, Pittsburgh	$42.95	$37.45	$35.95	$21.95
Basic pig iron, Pittsburgh	40.95	32.85	30.95	19.20
No. 2 Fdy. pig iron, Pittsburgh	39.95	36.55	31.95	19.45
Northern No. 2, Fdy., Chicago	39.00	35.70	30.00	19.00
Lake Superior Charcoal, Chgo	41.50	37.55	33.75	19.75
Malleable, Chicago	39.00	35.80	30.11	19.50
Southern No. 2, Birmingham	35.00	28.00	23.00	15.00
Southern Ohio No. 2, Ironton	37.00	36.00	30.00	18.50
Basic, eastern Pa	37.00	34.50	30.50	20.50
No. 2X Virginia, furnace	38.00	34.00	26.50	18.00
No. 2X foundry, Philadelphia	41.75	37.25	30.50	20.75
Ferro mang., delivered	340.00	275.00	175.00*	175.00*
Bessemer billets, Pittsburgh	72.50	67.00	60.00	45.00
Bessemer sheet bars, Pittsburgh	72.50	67.00	60.00	45.00
Open hearth sheet bars, Pitts	72.50	67.00	60.00	45.00
Open-hearth billets, Pittsburgh	72.50	67.00	60.00	45.00
Steel bars, Pittsburgh	3.35	3.21	2.975	2.50
Steel bars, Chicago	3.54	3.40	3.19	2.63
Iron bars, Philadelphia	3.659	3.509	3.159	2.559
Iron bars, Cleveland, local del'y.	3.00	3.00	3.00	2.40
Iron bars, Chgo. mill	$3.25	$3.00	$3.00	$2.35
Beams, Chicago	3.79	3.65	3.19	2.62
Beams, Pittsburgh	3.60	3.46	3.075	2.50
Beams, Philadelphia	4.159	3.759	3.509	2.659
Tank plates, Pittsburgh	4.50	4.20	3.575	2.67
Tank plates, Chicago	4.69	4.59	3.89	2.94
Tank plates, Philadelphia	6.659	5.659	4.909	3.809
Sheets, blk., No. 28, Pittsburgh	5.50	5.05	4.56	2.90
Sheets, blue anld., No. 10, Pitts.	5.00	4.70	4.125	3.00
Sheets, galv., No. 28, Pittsburgh	7.00	6.72	6.56	4.89
Wire nails, Pittsburgh	3.20	3.16	3.00	2.40
Connellsville fur. coke, contr	7.00	7.60	7.25	2.40
Connellsville fdy. coke, contr	8.00	6.90	6.375	3.50
Heavy melting steel, Pittsburgh	30.00	23.40	23.25	18.12
Heavy melting steel, eastern Pa.	25.50	23.75	26.50	17.75
Heavy melting steel, Chicago	26.00	23.00	20.25	16.75
No. 1 wrought eastern Pa	36.00	30.50	26.50	23.00
No. 1 wrought, Chgo	29.50	24.00	23.75	16.80
Rerolling rails, Chgo	31.50	27.25	27.25	17.90
Car wheels, Chicago	22.00	20.31	19.75	14.00

*Seaboard.

(For Additional Prices See Page 854.)

Basic Makes Sharp Upward Move

Scarcity of This Grade Causes Higher Quotations and $40 Valley is Done—Buyers Unable to Obtain All Tonnage Desired—Heavier Buying For Next Year in Western Districts Especially in Malleable—Prices Higher Generally

Pittsburgh, April 10.—Pig iron prices have advanced $2 to $3 a ton in the Pittsburgh district. Basic has sold at $40, bessemer at $42 and foundry and malleable at $40, valley, for delivery this year. Some dealers are asking $42 for basic and $45 for bessemer in the valleys. Fifty-dollar iron, talked of for 12 months, may become a reality before May 1. Advances in the price of basic have been almost spectacular. The market pumped from $35 to $37, subsequently to $39, and later to $40, valley, on actual sales. The United Alloys Steel Corporation, Canton, O., took 5,000 to 10,000 tons of basic for various deliveries this year at $35, valley; Follansbee Bros., Follansbee, W. Va., 2,000 tons of the same grade for this quarter, at $35, valley; a Youngstown interest sold 5,000 tons at $38, valley, and a local dealer today more than 1,000 tons at $40, valley. Brokers have offered the latter figure for round tonnages. The Kokomo Steel & Wire Co., Kokomo, Ind., is in the market for 5,000 tons of basic for the second half, and a melter in the Cincinnati district for 5,000 tons of basic for third quarter. Bessemer sold this week at $40 to $42, but the minimum figure seems to have disappeared. The Colonial Steel Co., Pittsburgh, has taken 3,000 tons at about $40, valley; another tonnage of equal size has been sold at $42, and some dealers are refusing to shade $45, valley. An Italian inquiry is pending for 10,000 tons. Foundry and malleable have been advanced to $40 minimum for delivery in 1917 and the first half of 1918 by the more important sellers. The Standard Sanitary Mfg. Co., Pittsburgh, bought about 6,000 tons of northern and southern irons for early shipment to plants at Louisville, Ky., Pittsburgh and New Brighton, Pa., paying $34 to $35, Birmingham, for southern No. 2 and $39, valley, for northern No. 2. The Westinghouse interests are buying additional foundry for this year. Gray forge iron is held at $37, valley. Basic continues to be offered quietly by a steel works interest which has been figuring in the market for several months.

Demand Quickens at Metropolis

New York, April 10.—Demand for pig iron in this district was quiet last week, but now is picking up and both good-sized inquiries and sales again are reported. Foundry for shipment late this year and over the first half of next year chiefly is sought. A New York state consumer asks 1,000 tons of foundry for first half; a New England consumer 6,000 tons of special iron for last quarter; different New Jersey consumers want 500 to 1,000 tons of high silicon for nearby; 500 to 1,000 tons of foundry for the first half of 1918, and 1,000 tons of foundry for first half, respectively; the American Locomotive Co., 3,300 tons of foundry and a small tonnage of standard low phosphorus for shipment to its Canadian plant over the next six months; and a Brooklyn consumer, 1,000 tons of foundry for third quarter. There are only a few of the inquiries which now are in the market. Eastern Pennsylvania iron now is quoted at a minimum of $41, furnace, or about $41.75, delivered New Jersey points for No. 2X for this year's shipment, while next year's iron has been sold at $36, furnace, although that figure probably could be shaded. Some central Pennsylvania furnaces are inclined to ask $43, but the highest

(*For complete prices see page* 854.)

they have done is $41, furnace, on sizeable, and $42, furnace, on inconsequential lots. One interest sold in the week equivalent to $38.75 to $39, furnace, but since has withdrawn. Virginia continues to be quoted on a minimum of $38, furnace, for No. 2X for this year, and at least one small tonnage of ordinary No. 2X has been sold at $40, furnace. Buffalo furnaces quote nominally $45, for No. 2X for this year. A central Pennsylvania furnace sold on the basis of $45, Buffalo. Among sales of standard low phosphorus iron is one for 2,000 tons for export for the first quarter. New export inquiries continue to appear, including 1,600 tons of foundry for England, 500 to 2,000 tons of standard bessemer and a small tonnage of No. 3 for France.

Less Active in East

Philadelphia, April 9.—Activity in the pig iron market is less marked. Numerous small lots but fewer large tonnages are figuring. The John A. Roebling's Sons Co., Trenton, N. J., is reported to have closed for 5,000 tons of basic for delivery over the first half of 1918. This company also has been inquiring for an indefinite tonnage of standard low phosphorus iron for the same delivery. An eastern Pennsylvania consumer has closed for 2,000 tons of coke malleable iron, 750 tons of low silicon and 350 tons of high silicon foundry for third quarter. The malleable is understood to have been done close to $41, delivered. Prices generally continue to show an advancing tendency. Eastern Pennsylvania foundry reflects a wide range but may be quoted at $41.50 to $42, Philadelphia, for 2X for this year's shipment. One stack has sold about 1,500 tons at $41, furnace, or $41.79, Philadelphia; another about 3,000 tons of high sulphur foundry at prices ranging from $40 to $42.50, furnace, depending on analysis. On central Pennsylvania irons prices in the main continue higher than on eastern Pennsylvania brands. One maker there as late as last Thursday, however, sold several small prompt lots at $40.75, Philadelphia, or $38.75 to $39, furnace. Since then this interest has not been offering. Another central Pennsylvania furnace, after selling small tonnages at $42, furnace, now is holding for $45. A third furnace sold a moderate tonnage at $41.25, furnace, for this year's shipment, and at $36, furnace, or $37.94, delivered New York, for next year, and now is not quoting. Virginia is at $38, furnace, as a minimum. During the week some fair sized tonnages were sold at $36 and $37, furnace, following which prices were advanced to $38, furnace, or $40.75, Philadelphia for 2X. One Virginia maker is quoting $40, furnace, minimum. Several tonnages for first half have gone at $34, Virginia furnace, and talk of $35 now is heard. A sale of 600 tons of special analysis No. 2 Alabama for shipment this year has been made at $36, Birmingham, and on ordinary No. 2 it is difficult to find a seller at less than $35, Birmingham. Among current inquiries for southern iron is one from a Lenoir City car builder for 2,700 tons of foundry grades for third quarter. The market on basic is from $37 to $38, delivered. Standard low phosphorus is quoted from $75 to $78, delivered, Philadelphia, and at least 3,000 to 4,000 tons, partly for this year and partly for next, were sold on this basis. Current reports on copper bearing low phosphorus iron range widely. This iron may be quoted at $65 to $75, eastern Pennsylvania furnace, with sales of moderate tonnages at the outside figure.

Market Report Index

	Page
Weekly Market Report	805
Pig Iron	808
Plates	810
Ferro-Alloys	811
Steel and Cast Iron Pipe	811
Tin Plate	811
Bars	812
Semi-Finished Steel	812
Sheets	813
Coke	813
Structural Shapes	814
Wire	814
Rails, Cars and Track Materials	814
Scrap	815
Ingot Production	817
Non-Ferrous Markets	820
Warehouse	820
Coke By-Products	839
Machine Tools	844

Advances are Sharp

Buffalo, April 10.—Prices of pig iron in the Buffalo district for delivery over the remainder of the year have reached a range of $40 to $45. The former seems to be the minimum generally on sales made during the week. One furnace interest is holding for $45, minimum, for any grade for such deliveries as may be made during this year. Some iron for delivery over the first quarter and first half of 1918 has been booked at less than $40. There is little or no metal available in foundry, malleable, basic and other grades. Producers for some time have been indisposed to take on additional business and the little selling that is taking place is the result of the urgent pressure on the part of melters in this and other districts. Malleable, basic and high silicon foundry grades are being held as high as $45; No. 2X foundry is quoted variously from $41 to $45 and the lower grades of foundry iron at a minimum of $40, for this year.

Prices Climb Further

Cleveland, April 10.—Greater strength is shown in pig iron. While sales during the past week declined from the previous week, this resulted from the reluctance or inability of producers to supply iron rather than to any unwillingness on the part of buyers to contract. Foundry iron is being more generally held at $40, furnace, for this year and at $38, furnace for the first half of next year, with sales on this basis. Sales of foundry grades have been made to Michigan consumers at $42. The demand in the Michigan district is exceedingly heavy and the fact that a number of consumers have been caught short of supplies has given greater strength to the market there. The Packard, Cadillac and other Detroit motor companies have bought foundry and malleable for next year and some consumers of this class still are seeking iron. A valley interest sold about 5,000 tons of basic at $38 today for immediate shipment. The 5,000 to 10,000 tons for last half to a Canton buyer went at $35, valley, to 35.95, delivered. A Canadian consumer inquired of valley makers for 5,000 tons of basic and is reported to have bought there. Malleable is strong. The Ferro Foundry & Machine Co., Cleveland, is inquiring for about 3,000 tons of malleable for last half delivery. One interest is understood to have refused a part of this inquiry at $40, valley. Another local buyer closed 2,000 to 3,000 tons of this grade for next year. The National Malleable Castings Co. recently asked for 10,000 tons of malleable for next year. While sales of pig iron for delivery in the first half of 1918 have been heavy during recent weeks, producers in the Cleveland district have sold less of their next year's production than makers in nearby districts. Local inquiry for 1918 has been light. Some lake furnaces have disposed of 50 per cent of their output for the first half of 1918.

Sanitary Company Buys

Cincinnati, April 10.—The Standard Sanitary Co. has purchased about 6,000 tons of foundry iron for nearby delivery at an average price of $35, Birmingham basis, for No. 2

(*For complete prices see page* 854.)

foundry. A central Ohio melter has taken 4,000 tons of northern foundry iron for last half. A Portsmouth, O., user is inquiring for 1,000 tons of special iron, the bulk of which is bessemer ferro-silicon. The pig iron market has developed a state where prices are determined before each sale by what the furnaces care to quote and how badly the buyer needs the iron. Southern No. 2 foundry is selling around $35, Birmingham basis, for the second quarter and last half of this year, and is offered from $32 to $34 for first half of 1918. One southern stack has made a flat price of $40, Birmingham basis, for the last half of 1917. Southern Ohio iron from the Ironton district and Hamilton, O., is quoted from $37 to $38, for No. 2 foundry, for the last half of this year and the first half of next year. Southern Ohio silvery iron for 1917 shipment is quoted from $46 to $48, furnace, for 8 per cent silicon.

Chicago Market Strong

Chicago, April 10.—Chicago sellers of northern pig iron have established a minimum of $39, furnace, for No. 2 foundry and malleable. At the same time sales have been made at $40, furnace. This promises to be the ruling quotation in a short time. These prices apply to any delivery during the present year. Increasing inquiry is being received for iron for first half of 1918 and some sales have been made. The price asked is $35, furnace. Inquiry for this delivery is increasing. An agricultural implement manufacturer on the Mississippi river is understood to have closed for about 7,000 tons of northern foundry iron for last half and first quarter delivery at about $38, Chicago furnace. Southern iron for last half of this year is increasingly scarce. Some selling agents in this territory are unable to place any further business for this year and there appears to be no ruling quotation. For first half of 1918, sales are reported at $35, Birmingham, but this is not confirmed. Several interests have taken business at $32, Birmingham. This price is being withdrawn. One southern interest is said to have sold 3,000 tons of foundry iron at $32, Birmingham. One maker of Lake Superior charcoal iron is quoting $43.25, delivered Chicago, for 1917 delivery, and $38.75, delivered Chicago, for next year.

War Unsettles Market

St. Louis, April 9.—The declaration of war has unsettled the pig iron market, and both buyers and sellers are disposed to wait and see what the effect will be. There were some good inquiries before the dealers, but important sellers have been forced to turn down the business, because they have nothing to sell, or because they prefer to wait until later in the hope of getting better prices. No accurate prices are obtainable, but No. 2 southern foundry pig iron is nominally quoted between $35.40 and $38.40. Deliveries still are backward, especially from the south.

Large Maker Again Selling

Birmingham, Ala., April 10.—Selling of pig iron for delivery into the first half of the coming year is more active. Sales have been made for first half of 1918 on a $33 basis for No. 2 foundry. Present quotations are around $32 for No. 2 foundry, with little effort by makers to book additional business. War activities have not disturbed the iron market in the southern territory as yet and confidence is expressed that conditions will continue satisfactory. Iron and steel manufacturers, as well as the foundry and machine shop proprietors have assured the government of their willingness to meet all calls for their products. One of the large sellers of the Birmingham district is returning to the market and offering iron for last quarter of this year or the first half of the coming year where consumers are willing to pay $35 for No. 2 foundry. Special brand and special analysis irons have sold in small lots above $35. The extraordinary production of iron in Alabama in March may be duplicated this month, as a fairly good start has been made. Some furnaces, however, are in need of repairs and the production may suffer. The railroad situation is easier. Consumers are asking for delivery on orders placed some time ago and some embargoes are being lifted. Southern furnace companies have some export iron yet to deliver and are waiting transportation facilities.

Plates Tightened By War

Makers Hold Themselves For Government Tonnage and This Adds to Reflected Tonnage—Prices Go Steadily Upward

Philadelphia, April 9.—An enormous amount of business offered to eastern platemakers continues to boost prices. More tonnage was refused last week than in any previous week, because the mills were unable to accept it. Included in the business refused were 18,000 tons of Lloyds ship steel, 2,000 tons of Lloyds boiler steel, plates for 250 locomotives for a foreign country, 6,000 tons of ship steel for the far west and many other similar lots. One leading eastern Pennsylvania maker now is quoting, on such orders as can be taken, for shipment at the mills' convenience, as follows: Tank plates, 7.159c; Lloyds ship plates, 8.659c to 10.159c; ordinary flange plates, 7.309c; Lloyds flange plates, 10.159c; Lloyds fire box plates, 10.209c; marine plates, United States standard, 16.159c to 17.159c, all delivered Philadelphia. Another eastern Pennsylvania mill which is refusing to take everything offered, with the exception of a small tonnage here and there, quotes nominally 10c, Pittsburgh, on Lloyds ship plates, and from 5.50c to 7c, Pittsburgh on tank plates. Another eastern Pennsylvania maker has taken a little business in tank plates at 6.50c, Pittsburgh, and still quotes this figure as a minimum. The coming requirements of the government and the desire of the platemakers to be in the best position possible to co-operate fully, aside from their sold-up condition, supply the reason these interests are refusing new tonnages. In this connection it is interesting to note that a Japanese yard which last week hesitated over a quotation of 8c, Pittsburgh, on a huge tonnage of Lloyds ship plates for distant delivery, now is unable to place its order at 10c.

Clear Decks For War

Pittsburgh, April 10.—Rolling mill managers have been instructed to give preference to the United States in arranging rolling schedules. The navy will experience no difficulty in obtaining material promptly. Many plate makers in a position to supply fairly early delivery are selling plates at $52 a ton above the price of 2.90c which has been agreed upon for government needs. Demand for plates from the domestic trade continues extremely heavy. Specifications against contracts in the week just ended were heavier than those received in the preceding period. Heavy tonnages of light steel plates are involved in pending inquiries for camp ranges.

Plate Price Advances

Chicago, April 10.—The situation in the steel plate market is somewhat uncertain. The nominal quotation by the leading interest for deliv-

(*For complete prices see page* 854.)

ery at convenience, which means third quarter of 1918, is 4.69c, Chicago. Prompt delivery plates are 6.19c, Chicago. A recent sale of 1,000 tons for delivery at convenience during 1917 brought 6.50c, Chicago. It is understood this material is for export. Plates which pass Lloyds specifications are bringing $20 to $30 per ton extra.

Pipe Prices Are Pegged

Makers of Tubular Goods Have Had No Trouble in Maintaining Advance—Cast Pipe Quiet

Pittsburgh, April 10.—Makers of tubular goods have experienced no difficulty in establishing prices adopted April 2, when steel pipe was advanced $10, and iron pipe $12 to $14 a ton. Heavy demand exists for boiler tubes for merchant purposes. Boiler makers working on contracts for the government, are given precedence in rolling schedules. Heavy tonnages of oil country goods are being shipped to the west and southwest on contracts placed some time ago. If mills could meet specifications for delivery, it is likely that a number of important pipe line projects now under consideration would be undertaken. Deliveries of line pipe are deferred from seven to 12 months. Shipments of merchant pipe generally are from three to six months in arrears.

New Business Unimportant

New York, April 10.—The cast iron pipe market during the week has not disclosed any important business. The New York department of water supply has opened bids on 157 tons of 8 and 12-inch pipe for Manhattan, on which the United States Cast Iron Pipe & Foundry Co. is low at $51.63, delivered. Bids on 225 tons of 6 to 16's for Richmond have been rejected, due to the high prices quoted. R. D. Wood & Co. have taken at $41.50, delivered Tarrytown, N. Y., 230 tons of 6, 8 and 10's to be shipped from stock. The bid of the Wood company on pipe to be made subject to inspection, was $46.50. The market on 6-inch class B cast iron pipe, delivered at New York, continues to be quoted at $50.50, with 4-inch class B at $53.50.

Operations Are Profitable

Birmingham, Ala., April 10.—Cast iron pipe plants in the Birmingham district are melting heavily. Recent advances in pipe prices apparently have not interrupted market activity. A good tonnage is being bid on by southern pipe makers. Some pipe makers having bought liberally pig iron for future delivery now are reaping advantage of their foresight. George B. Tarrant, of the National Cast Iron Pipe Co., at Tarrant City, near Birmingham, announces that the earnings of his company for the first six months of this year will be not less than $75,000, and that iron purchased around $18 is being melted. Sanitary pipe also is in good demand, with advancing quotations.

Buy Little Cast Pipe

Chicago, April 10.—High prices continue to restrict inquiries and sales of cast iron pipe. An important maker is quoting 4-inch pipe at $53.50, Chicago, and 6-inch and larger at $50.50, Chicago, but apparently some makers are willing to take less. Hammond, Ind., has awarded 2,600 tons to the American Cast Iron Pipe Co. Other makers are asking $2 a ton above quotations of this maker. The deferred letting at Winnipeg on 5,000 tons of 48 to 60-inch pipe will come up April 16.

Ferro-Alloys Higher

$400 Quoted on English Metal—Western Market Steady

New York, April 10.—Prices on 80 per cent ferro-manganese continue to move toward higher levels. Domestic ferro-manganese for shipment in May, sold about a week ago at $325, delivered, in the east, and since then, June shipment has been sold at slightly higher than $340, delivered. The domestic market is quoted now at about $325 to $375, delivered. Asking prices usually are higher than this level, however. One interest is asking $400 a ton, while another is asking $6 a unit or $480 a ton. No prices are heard on English ferro-manganese and there have been no developments in these brands.

Active demand characterizes the market on spiegeleisen and there are inquiries involving 5,000 to 7,000 tons for shipment both this and next year. The only business reported is in shipment during second and third quarters, which has been done at $75, furnace.

The market on 50 per cent ferro-silicon continues devoid of offerings. Further sales of small spot lots have been made to gray iron foundries at 25c, per pound. The earliest deliveries to be had, apparently, are in July, which are offered at $225, delivered. Among new inquiries is one for 300 tons of bessemer ferro-silicon for a New Jersey consumer.

Ferro-Silicon Advanced

Pittsburgh, April 10.—Sellers of lower grades of bessemer ferro-silicon have advanced prices $5 a ton all along the line to $60, furnace, for 10 per cent. Sales at that figure are reported. Scarcely any free bessemer ferro-silicon is available for the second or third quarters of the year. Reports of domestic ferro-manganese selling at as high as $400 a ton, delivered, are heard. Generally, dealers are making no firm prices. Spiegeleisen is being held at as high as $80, furnace, for nearby.

Western Market Firm

Chicago, April 10.—Conditions in the market for ferro-manganese are unchanged and the western maker still quotes $325, Chicago furnace, for spot material, including all of second quarter, and $300, furnace, for third and fourth quarter delivery. Demand is strong and new business is somewhat difficult to place.

Quotes $400 on Car

Cleveland, April 10.—Spot ferro-manganese is extremely scarce and a buyer in this territory seeking a carload for the third quarter was able to develop only one offer of $400, seaboard, for English metal. Domestic makers have little for sale before late in the year.

Tin Plate Prices Steady

Pittsburgh, April 10.—Packers supplying food to the army and navy are having no difficulty obtaining tin plate for the manufacture of cans. Most mills already have disposed of their entire output for shipment in the third quarter of the year, and some tin plate makers virtually are out of the market for delivery the remainder of 1917. The American Sheet & Tin Plate Co. has made no change in its $7.50 price for second half shipment. Some makers are selling material at as high as $10, base, for delivery within the next 90 days. Terne plate is described as scarce, because terne plate mills are being used for the manufacture of tin plate. Several tin plate makers are attending a conference at Washington in an effort to expedite shipments to packers shipping tinned goods to the government.

Price is Hardening

Pittsburgh, April 10.—The 7c price on cold rolled strip steel gradually is disappearing. Rather heavy tonnages for forward shipment are being sold at 7.50c to 8c, base. Material is commanding 10c and 11c, base, for prompt delivery.

(For complete prices see page 854.)

Push Aside Export Demand

In Steel Bars Until Government's Needs Are Known—Shell Makers Inquire For Tonnages of Rounds

New York, April 10.—Demand for steel bars in this district is exceedingly heavy, particularly because of large export inquiries. The export demand involves principally rounds and squares in small sizes ranging up to 1½ to 2-inch in lots of 500 to 2,000 tons The mills are loath to quote on this business, owing to their sold-up condition and because they are inclined to wait to ascertain the extent of government needs before committing themselves. Most of the new business in steel bars is for small lots, some of which are coming from stock. Prices generally range between 3.75c and 4c, Pittsburgh, or 3.919c and 4.169c, New York, although 4.25c, Pittsburgh, is being done occasionally.

Demand is Heavy

Philadelphia, April 9.—Demand for steel bars continues heavy but mills are careful in accepting any further tonnages because of their desire to reserve unsold output for government requirements. The minimum of most producers is 3.75c, Pittsburgh. On miscellaneous lots, 4c or higher is being done. The minimum of one eastern Pennsylvania maker is 4c, Pittsburgh. Refined iron bars continue to be quoted at 3.50c, Pittsburgh, or 3.659c, Philadelphia.

Shell Steel Wanted

Pittsburgh, April 10.—Inquiries are pending for about 1,000,000 1-pound shells for submarine chasers. Numerous negotiations have been opened for rounds, but the details of these inquiries are not made public. A manufacturer of munitions is in the market for 5,000 tons of rounds and 5,000 tons of gothic billets for early delivery. Steel bars now are being held at 3.35c minimum for delivery at maker's convenience. A sharp early advance is likely.

Steel Bars Steady

Chicago, April 10.—Uncertainty regarding government war needs is keeping the steel bar market steady and quiet. Some makers are holding back on further sales until the situation clears. Nominal quotations prevail, with premiums for prompt material. The latter is difficult to obtain. Hard steel bars rerolled from rails remain strong at 3.25c, Chicago mill, with the expectation of an advance shortly. Small lots have been booked as high as 3.75c, Chicago mill.

Bar Iron Advances

Chicago, April 10.—Chicago bar iron mills have advanced quotations generally and 3.25c, Chicago mill, is the prevailing price. Up to a short time ago orders could be placed at 3c to 3.10c, Chicago mill. Some tonnages have been booked at the new price. This applies mostly to prompt iron, as few makers are willing to sell for last half. Practically nothing is being booked beyond third quarter.

Bar Iron Advancing

Cleveland, April 11.—Bar iron has been advancing here rapidly and steadily the past few days, due to the rise in wrought scrap. Today's quotation appears to be 3.40c to 3.50c, the former quotation being for outside shipment. It is expected the 3.50c quotation will be minimum in a few days.

Shafting at 5 Off

Pittsburgh, April 10.—Cold rolled steel shafting makers in a position to meet specifications for delivery in 90 days have no difficulty in selling at 5 off. For extended shipment, some tonnage recently has been offered at 15 per cent off. For immediate delivery, from 5 to 15 on the list is being obtained. Heavy tonnages of shafting are being used for the manufacture of fuses.

Hoops and Bands Higher

Pittsburgh, April 10.—Makers of hoops and bands are unable to offer additional tonnages for shipment in the second or third quarters of the year. Some mills are obtaining 4.35c for bands and 4.50c for hoops. The Carnegie Steel Co. has no formal prices on either product, quoting only upon application.

Advance is Expected

Pittsburgh, April 10.—Ship builders are specifying briskly for rivets, nuts and bolts. Prices on nuts and bolts likely will be advanced several dollars a ton soon. No change has been made in these products since the adoption of the 3c price on steel bars. Deliveries are deferred from three to six months.

Ship Builders Buy Chain

Pittsburgh, April 10.—Heavy tonnages of steel chain are being delivered to ship builders along the eastern seaboard. Steel chain now is being held at 7c for ⅜-inch proof coil, or $10 a ton above the price prevailing a fortnight ago. Lake ship builders have placed some large orders recently, one for more than 500 tons.

(For complete prices see page 854.)

Billets and Bars

Are in Large Demand—Deliveries Being Rushed.

Pittsburgh, April 10.—Manufacturers of sheet bars, have been instructed to give preference to specifications from tin platemakers, in order to meet demands of packers supplying food to the army and navy. Both billets and sheet bars are being held at $70 to $75, mill. A manufacturer in this district is inquiring for 10,000 tons of slabs. Several steel casting interests which had been furnishing ingots for munitions, now are offering this material in the open market. Ingots have been purchased as low as $55 a ton this week. Wire rods generally are being held at $85, Pittsburgh, but due to the infrequency of sales it is difficult to quote accurately. Muck bar is firmly held at $60, Pittsburgh. Inquiries are pending for 5,000 tons of 7-inch gothic billets for prompt delivery to a munition maker.

Deliveries Are Rushed

Philadelphia, April 9.—Specifications for billets are coming to the mills in great volume from consumers in this district who need steel for navy requirements. Deliveries are being rushed both at the request of the naval authorities and owing to a desire of the steelmakers to co-operate with the government as effectively as possible. Small tonnages of off-grade forging blooms have been sold at $80 to $85, eastern Pennsylvania mill. The market on standard semi-finished steel is very strong. Forging billets are quoted at a minimum of $100, and open hearth rerollers are from $75 to $80, eastern Pennsylvania mill. The Carbon Steel Co., Pittsburgh, has been inquiring here for 10,000 tons of slabs.

Constabulary Is Assured

The passage by the assembly of the Mills bill practically assures the establishment in New York of a state

constabulary similar in character to that which for a number of years has been maintained in Pennsylvania. The senate recently passed the bill and Governor Whitman has been an enthusiastic supporter of the measure, so that his signature is considered assured. The bill has had a stormy voyage through the legislature due mainly to attacks by labor unions.

Coke Firmer

Due to Reduced Output—Some Furnace Buying

Pittsburgh, April 10.—Prices of Connellsville furnace and foundry coke have advanced slightly, as the result of curtailed production caused by the observance of holy week. Forty-eight-hour fuel is selling at $8 to $8.25, ovens, and spot foundry coke at $9.50, ovens, and above. The market for contract coke shows no important change. Blast furnace managers continue to cover requirements from month to month. The bulk of the cupola fuel for delivery in the second half has been sold from $6.50 to $9, ovens. A rather acute shortage of cars existed during most of the week. Gradual improvement is expected. *The Connellsville Courier*, for the week ending March 31, says production of coke was 369,790 tons, an increase of 1,126 tons, compared with the week before.

Furnaces Buy Fuel

Philadelphia, April 9. — Further sales of furnace coke for shipment in April have been made to buyers in this district at $8.25, Connellsville. Sales of prompt shipment foundry coke have been made at $9.50, Connellsville.

Three eastern blast furnace interests are inquiring here for additional last half coke requirements. These inquiries aggregate 10,000 to 15,000 tons.

Object to High Prices

Birmingham, Ala., April 10.—Coke continues in strong demand with the highest prices in history still prevailing. Sales of $15 foundry coke are small. Consumers of furnace coke are objecting to the prices asked by two or three manufacturers and $8 has not been done to any considerable extent.

Ovens Sell Coal

Cincinnati, April 10.—Users of coke who cannot secure sufficient deliveries on contracts are paying fancy prices for prompt fuel, ranging from $12 to $15, ovens, for foundry coke. This grade for contract delivery is given from $7 to $11, ovens.

Black Sheets at 6 Cents

Blue Annealed and Black Held at Same Figure in Valleys —Government Inquiry is Heavy

Youngstown, O., April 10.—The minimum figure on either black or blue annealed bessemer sheets in the Mahoning valley now is 6c. Black sheets are selling at as high as 7c. Galvanized bessemer sheets bring from 8c to 8.25c. Demand for all grades, especially blue annealed, is tremendous. Finishing mills in this territory do not report any extensive government business. When it does come, and at the lower prices demanded by the government, commercial users may have to pay proportionately higher figures for such material as they may be able to get, unless the government interferes. Only two mills in the valley figure in the market to any extent at present. One of these sells only black bessemer sheets. Neither is willing to take any future business; they quote only upon such spot orders as they are in position to fill.

Inquiries are almost equally heavy from both domestic and foreign sources. Not much foreign business is being quoted upon. However, considerable quantities sold to domestic buyers eventually find their way to foreign consumers.

Production of coated sheets continues to improve; from 60 to 70 per cent of the pots in the valley now are in operation, but they are working mostly on material bought some time ago and delayed by low production, caused by inadequate shipments of spelter and sulphuric acid. Not much galvanized business is being taken by any of the producers. There is less profit in it than in blue annealed or black, even at present prices. The lack of a differential between blue annealed and black sheets is due to the extremely heavy demand for the annealed grade.

The car situation is tightening up again and getting worse. Those mills which do not have stocks of sheet bars on hand are hard put to it; some of them are crippled. Total aggregate production of sheets in proportion to capacity in the valley is probably less than 90 per cent, notwithstanding that the leading interest reports its mills as running full.

Government Wants Sheets

Pittsburgh, April 10.—Manufacturers of steel sheets have received inquiries for heavy tonnages for delivery to the government. Because of the quiet manner in which the army and navy is figuring in the market, it is increasingly difficult to obtain much information about war purchases. Occasionally, however, inquiries come into the open market. Inquiries are pending for many thousands of camp ranges to be made of sheet steel. Sheets also are being used in large quantities for making buoys and mines, and it is likely that orders soon will be distributed for sheet steel barracks.

The domestic market continues active and prices are climbing toward higher levels. The leading interest has made no change in quotations since the opening of books for third quarter delivery. Some manufacturers are selling black sheets at 7c, blue annealed at 6.50c and galvanized stock at 9c, base. Rather heavy demand exists for shipment abroad, but these inquiries are not being considered, for obvious reasons.

Rushing Government Needs

Philadelphia, April 9.—Sheetmakers in eastern Pennsylvania have been asked by the United States naval authorities to rush deliveries on sheets to manufacturing concerns who have contracts for navy requirements. There is a heavy demand for sheets, but the mills are going slowly in booking new contracts. The leading eastern Pennsylvania maker now quotes 6c, Pittsburgh, as the minimum on No. 10 gage blue annealed for third quarter shipment.

Sheet Prices Advance

Chicago, April 10.—Independents are conforming to the new schedule of prices recently announced by the leading interest. Some independents have been asking prices equal to the new schedule for some time. The latter quotes No. 10 gage blue annealed at 5.44c, Chicago mill, and No. 28 gage black at 5.94c, Chicago mill, on open hearth. Bessemer sheets may be obtained at 25 cents per 100 pounds less, but are in small demand. To meet the government's demands for tin plate for food canning requirements, steel makers are furnishing larger quantities of sheet bars to sheet mills. This is reducing somewhat the tonnage to other customers. This development is increasing the output of sheet mills which have not been operated at full capacity.

The Lehigh Car Wheel & Axle Works, Fullerton, Pa., has increased the wages of its employes by 25 cents a day.

(*For complete prices see page* 854.)

Navy Yards Need Shapes

Pending Tonnage Includes Round Lots For Extensions of Government Plants

Philadelphia, April 9.—Most of the tonnage now pending for plain structural shapes in this district originates with the requirements of United States navy yards. This business includes 9,000 tons for crane runways at the Norfolk navy yard; 3,500 tons for a machine and electrical repair shop at the League Island navy yard and 3,500 to 5,000 tons for a structural shop at the League Island navy yard. Pending government work also includes 4,150 tons for a gun shop at Washington. The principal business pending, aside from government work is in proposed subway extensions in this city, involving 20,350 tons. Plain structural shapes shows a strong upward trend and are quoted by eastern mills at 4c to 4.25c, Pittsburgh, or 4.159c to 4.409c, Philadelphia. The inside price applies only to small lots from old customers for shipment at mills' option. From 4.25c to 4.50c, Pittsburgh, is being realized on small lots for shipment from stock as early mill delivery. Ship shapes still are advancing and on one round tonnage, 6.50c, Pittsburgh, was quoted this week.

Accommodating the Government

Pittsburgh, April 10.—A price of 2.50c, offered the government on structural shapes for war purposes, is $22 a ton below the prevailing minimum quotation for delivery at the convenience of the maker. Previous obligations and rolling mill schedules are being waived to meet requirements of the government. Demand for shapes continues very heavy. Material is offered at 3.60c for future delivery, but an advance in price appears imminent. The government continues to figure on a number of aeroplane hangars.

Construction Held Back

Chicago, April 10.—Demand for bridge material from the railroads and for highway improvement comprises the greater part of new structural buying. The present price of fabricated material is holding back much construction which ordinarily would come out. Prices on plain material remain unchanged.

High Prices Check Work

Cleveland, April 10.—A minimum of new work is coming out in this district, owing to the high cost of construction. One contract involving 600 tons has been postponed indefinitely because of high prices. The shops continue to be handicapped by delays in the deliveries of plain material and by short and inefficient labor. A 2,500-ton power plant at Akron is up. It will probably be some weeks before bids are asked for the new Lorain high level viaduct, which will require about 4,000 tons. Eastern mills now are holding shapes at 4c, mill, or 4.204c, Cleveland, for shipment at convenience.

CONTRACTS AWARDED.

Public library, Philadelphia, 2,000 tons; general contract to the George A. Fuller Co.

Office and gymnasium for the Goodyear Tire & Rubber Co., Akron, O., 500 tons of reinforcing bars to Lackawanna Steel Co.

Masonic Temple, Masonic Temple Association, Sacramento, Cal., 500 tons, to Palm Iron Works.

Coal handling structure for Public Service Co., Blue Island, Ill., 242 tons, to Rochester Bridge Co.

Six buildings, Sinclair Refining Co., Argentine, Kans., 196 tons, to Kansas City Structural Steel Co.

Power station, Illinois Northern Utilities Co., Dixon, Ill., 173 tons, to Lakeside Bridge & Steel Co.

Bridge work, Chicago, Great Western Railroad Co., 154 tons, to American Bridge Co.

Factory building, Piqua Handle & Mfg. Co., Marquette, Mich., 105 tons, to Duffin Iron Co.

Mott avenue station, Interborough Rapid Transit Co., New York, 200 tons, to Bethlehem Steel Co.

Station at 149th street, Interborough Rapid Transit Co., New York, 700 tons, to Bethlehem Steel Bridge Co.

Bridges for Norfolk & Western railroad, 200 tons to independent fabricator.

Extension, Boston Elevated railroad, 800 tons, to L. F. Shoemaker & Co.

Building, New York Telephone Co., Elmhurst, L. I., 350 tons, to Bethlehem Steel Bridge Co.

Three bridges for Pennsylvania railroad, 150 tons, to L. F. Shoemaker & Co.

Transmission towers for Electric Bond & Share Co., New York, 3,000 tons, to American Bridge Co.

Pattern shop, 300 tons, and crane runway 100 tons, for Brier Hill Steel Co., Youngstown, to McClintic-Marshall Co.

New plant for Erie Forge Co., Erie, Pa., 2,000 to 3,000, to Lackawanna Bridge Co.

Reconstruction of Louisiana street viaduct, Buffalo; 300 tons reinforcing steel, to Eastern Concrete Steel Co., Buffalo; superstructure, 800 tons, general contract to Peckham Construction Co., Buffalo, and steel to American Bridge Co.

CONTRACTS PENDING.

Crane runways for the Fore River Ship Building Corporation, Quincy, Mass., 3,000 tons; bids being taken.

Power house, Firestone Tire & Rubber Co., Akron, O., 2,500 tons; bids being taken.

Addition to building of Bostwick-Braun Co., Toledo, 600 tons, indefinitely postponed.

Building for National Lead Co., Brooklyn, 400 tons, bids being taken.

New York State Erie Barge Canal Contract No. 138, Genesee river dam, Rochester, 750 tons structural and 65 tons gatehouse and operating machinery; bids taken.

Dry dock for United States government League Island navy yard, Philadelphia, 2,500 tons.

Power house for Edison Electric Illuminating Co., Boston, 600 tons, bids being taken.

Addition to plant of General Electric Co., Schenectady, N. Y., 500 tons, bids being taken.

Addition for Jas. McCreery & Co., store, New York, 225 tons, bids being taken.

Stanley theater, Philadelphia, 1,150 tons, bids being taken.

Office building for Gaston, Williams & Wigmore, Inc., 35 Broadway, 1,400 tons, bids being taken.

(*For complete prices see page* 854.)

Railroad Buying

Appears at an End—Car Inquiry Low in Big Center

Chicago, April 10.—Although buying of standard steel rails had seemed about over, the western maker has booked one lot of 35,000 tons for a railroad in the northwest. A few small tonnages in addition brought the total sales of the week to about 40,000 tons. Comparatively little business is being done in track fastenings. Prices remain steady.

Government Asks Cars

Chicago, April 10.—Car buying is at a minimum and the market is almost bare of inquiry. Some passenger cars are being asked. The government has put out an inquiry for 12 gun carriage cars of unusually heavy type, which will not require much steel and can be turned out promptly.

Revises Rail Inquiry

Cleveland, April 11.—An inquiry for 3,000 tons of rails for delivery around the middle of 1918 has been revived by the Ann Arbor road. It is doubtful whether the mills can supply the shipment desired.

Another Advance

Pittsburgh, April 10.—Manufacturers of wire products supplying material to the United States government, virtually have withdrawn from the domestic market. Orders are being scrutinized more closely than ever and contracts in many cases are being reduced. The American Steel & Wire Co. is shipping heavy tonnages of wire rope to the government for submarine nets. Large quantities of wire are being used for anchoring mines and buoys. No official change in prices has been made since the adoption, March 5, of the $3.20 quotation on nails. Reports are current that prices will be put up from $2 to $4 a ton soon. Independents selling at advances of $3 to $4 per ton are specifying briskly for the spring trade. Stocks are described as low.

Steel Scrap Near Record

Steel Corporation Subsidiaries Buy Heavy Tonnage Up to $30 Delivered—Various Districts Affected By Transaction

Pittsburgh, April 10.—As a result of heavy buying by subsidiary companies of the Steel Corporation, prices of iron and steel scrap have advanced about $4 a ton higher in the Pittsburgh district. The Carnegie Steel Co. is credited with having taken approximately 50,000 tons of heavy melting material, paying as high as $30, Munhall. Buying of steel also has been done by subsidiaries for shipment to Newburg, O., and Gary, Ind. Heavy melting stock had not sold at as high as $30, delivered, in more than 25 years. Only a few dealers at this center ever have sold melting steel at the prevailing price. Other grades of scrap have advanced several dollars a ton. Low phosphorus steel is commanding $35 a ton. Sizeable tonnages of this grade are being shipped to eastern points, probably for the manufacture of steel for the government.

Pittsburgh Draws on East

Philadelphia, April 9.—Large tonnages of steel scrap have been bought throughout the east during the past week for shipment to the Pittsburgh district, where consumers are paying considerably higher prices than the mills in this district are willing to pay. Higher than the equivalent of $28, Pittsburgh, has been paid here for tonnages of heavy melting steel. Large quantities of steel scrap which normally would come to eastern Pennsylvania are going to Pittsburgh from various points in New York state and New England. For wrought scrap and cast scrap there is a strong local demand, with a corresponding influence on prices. No. 1 railroad wrought iron is quoted at $35 to $37, delivered eastern Pennsylvania. There is a scarcity of old car wheels which now are bringing $25 to $26.

Steel Higher at Buffalo

Buffalo, April 10.—The advances in heavy melting steel indicated by the large inquiry and the stiffening of the market a week ago now have taken place. This grade of old material is being quoted and sold at $27.50 to $28. The local demand for heavy melting steel continues strong. Sales and inquiries also include considerable tonnages for delivery in the Pittsburgh and valley districts. The demand for other lines in the list has caused price advances in low phosphorus, railroad wrought, car wheels, railroad malleable, machine shop turnings, heavy axle turnings, old iron rails, wrought pipe, busheling scrap and bundled sheets.

Prices Strong

Cleveland, April 9.—Buying movements in other trading centers have not affected the Cleveland scrap market. Prices are strong and firm, but no important dealing is being done. Dealers are trading among themselves to cover short sales, and carload lots are being bought by consumers, principally for temporary needs. As the railroad situation has not improved measurably in this district, dealing is predicated mainly on destinations least affected by embargoes. Heavy melting steel is quoted at $26 to $27; bundled sheet scrap at $16 to $16.25; railroad car wheels, $22 to $23; machine shop turnings, $10.75 to $11; cast borings, $11.75 to $12; stove plate, $15 to $15.50. All other lines of old iron and steel have been marked up.

Chicago Scrap Rising

Chicago, April 10.—Iron and steel scrap continues to advance in this district. Prices now are practically at the highest point since the war, although in some items a higher figure was reached last year. Heavy melting steel was sold in fair tonnages during the week at about $26 per gross ton, but probably this price cannot be duplicated. Rerolled rails are quotable at $31 to $32, but they are scarce. Some dealers are holding for much higher prices. Railroads appear to be moving their winter accumulations and an unusual number of lists are current, mostly small. Shortage of labor apparently prevents larger tonnages being offered. Those lists now offered include: Santa Fe railroad, 2,950 tons; Union Pacific railroad, 2,000 tons; Wabash railroad, 1,300 tons; Kansas City Southern, 1,100 tons; Monon railroad, 830 tons; Northern Pacific railroad, 830 tons; Mobile & Ohio railroad, 800 tons, and the Omaha road, 300 tons.

Prices Still Rising

St. Louis, April 9.—Scrap continues active and strong, with practically every transaction being made at a higher price than the preceding one. Dealers still are actively covering their short sales and consumers show an inclination to purchase at the market. The war situation has caused no effect in this district as consumers are well booked ahead on orders and will continue to make heavy purchases of scrap as long as they have labor available to operate their plants. Railroad offerings are more plentiful, including this week: Pennsylvania Lines West, 3,250 tons; Wabash railroad, 2,600 tons; Mobile & Ohio, 1,000 tons; Texas & Pacific, 1,000 tons; Union Pacific, 750 tons, and Kansas City & Southern, 200 tons.

Steel in Heavy Demand

Cincinnati, April 10.—Continued heavy demand for steel scrap has brought about advances of from 50 cents to $1 a ton. Inquiry is heavy from all parts of this territory, and especially so from northeastern Ohio and the valley. Reports of large purchases of heavy melting steel by a leading Pittsburgh buyer around $30 per gross ton, delivered, have reached here. This material is quoted in Cincinnati from $23.50 to $24.50, delivered. Bundled sheet scrap is from $15.50 to $16 per gross ton. Machine shop turnings, cast borings and heavy turnings are unchanged. No. 1 machine cast is from $19.25 to $19.75 per net ton.

Pittsburgh Buys at New York

New York, April 10.—The feature of the old iron and steel market here is the keen interest in steel scrap displayed as a result of the top prices which were paid in the Pittsburgh district. Some good-sized tonnages of heavy melting steel have been sold by New York dealers to Pittsburgh, at $28, delivered, or around $24.50 to $25, New York. Eastern consumers of steel scrap are doing little. Demand from nearby foundries for cast scrap is heavy and the market is strong. Wrought scrap also is strong, due to a good demand from eastern Pennsylvania. Car wheels, old steel shafting and No. 1 heavy melting steel have advanced $1 during the week.

Strength in the South

Birmingham, Ala., April 10.—Scrap iron and steel prices show added strength with demand still active. Slight changes in prices have taken place during the week. Dealers report plenty of stock for all demands. Consumption again is enlarging and indications point to the need of a still greater tonnage of scrap. Melters show dissatisfaction with advancing prices, but dealers call attention to disparities in iron and steel products and scrap and to the higher prices asked for by producers of old material. Turnings show the least activity.

(*For complete prices see page* 854.)

Steel Makers Save Nation Millions

Agree to Furnish For War Purposes Plates at 2.90c and Shapes and Steel Bars at 2.50c—Tonnage Still Indefinite and Will Be Dependent on Length and Activity of War

Washington, April 11.—A vast sum will be saved to the government's war chest by the agreement of steel manufacturers to supply plates at 2.90c and structural shapes and steel bars at 2.50c per pound for the requirements of national defense. These prices were determined upon after conferences during the week by Secretary of the Navy Josephus Daniels and President James A. Farrell, of the United States Steel Corporation. Mr. Farrell was acting as vice chairman of the special committee of the American Iron and Steel Institute recently appointed at the suggestion of the council of national defense to facilitate the securing of material for ships and munitions. The agreement, according to Mr. Daniels, provides that there is to be no increase in prices over those applying to material used in the 1916 naval program. The present year's program alone will call for 200,000 tons of hull steel. The requirements for the navy have been greatly increased by the additions to be built to the ship yards and naval stations.

"The prices agreed upon," said Mr. Daniels, "are substantially lower than current market prices. It is estimated that they involve a saving of approximately $18,000,000 over the prevailing prices on the tonnage required."

The prices fixed are to apply to the war department as well as to the navy department. The requirements of the former, however, will be much less than those for the navy department. It is understood that Mr. Farrell first urged a price of 3c for plates. Mr. Daniels insisted that this figure be lowered and the further concession was agreed upon.

The special committee of the institute had been negotiating at New York for more than a week with the government, represented by Bernard M. Baruch, chairman of the committee on metals of the council of national defense. This committee was headed by Chairman Elbert H. Gary, of the Steel Corporation, and included besides Mr. Farrell many prominent independent manufacturers. Among these were Alva C. Dinkey, of the Midvale Steel & Ordnance Co.; Charles M. Schwab, of the Bethlehem Steel Corporation, and others.

The council of national defense has announced the formation of committees on brass and aluminum products to serve in conjunction with the committee of raw materials of the advisory commission of the council. The committees are as follows:

Brass:—Charles F. Brooker, president of the American Brass Co., Waterbury, Conn.; C. D. Goss, president of the Scoville Mfg. Co., Waterbury; Lewis H. Jones, president of the Detroit Copper & Brass Co., Detroit; Barton Hazelton, secretary and treasurer and general manager of the Rome Brass Co., Rome, N. Y.; F. J. Kingsbury, president of the Bridgeport Brass Co., Bridgeport, Conn.

Aluminum:—Arthur F. Davis, president of the Aluminum Co. of America, New York; E. E. Allyne, president of the Aluminum Castings Co., Cleveland; Joseph A. Janney, of Janney, Steinmetz & Co., Philadelphia.

It is stated by Mr. Baruch that organization of committees in other industries with products vitally necessary to the government in time of war, is under way.

Vast Tonnages Necessary

Washington April 11.—Steel needs for the navy, it is estimated here, will amount to 300,000 tons. Of this total, 200,000 tons will be necessary for hulls of naval vessels. The remaining 100,000 tons will be used for additions to navy yards, submarine bases, etc. Estimates for government requirements of steel indicate that the total will be 600,000 to 1,000,000 tons. This appraisal is merely the rough aggregate and admittedly is not accurate. If it were based on probable tonnage for all purposes, such as guns, shells and armor plate, it would probably exceed these figures. No agreement has been made as to price of steel entering into the production of ordnance.

Steel Men Join Colors

A wave of patriotism is sweeping through the industries of the country. The stand for true democracy assumed by the United States in its

What the Reduced Prices Really Mean

Secretary Daniels' statement that the reduced prices for steel made to the government by the manufacturers will result in a saving of about $18,000,000 is more than conservative. It has been estimated in highly authoritative quarters that the government steel requirements comprising mainly those for new naval vessels, navy yard enlargements, naval stations, aeroplane hangars and a multitude of other needs mainly related to the defensive arms of the nation on the seas, is not less than 500,000 to 600,000 tons. Hull work alone for the 1917 naval program calls for about 200,000 tons. The needs of the army also are to be supplied at the agreed price. The extent to which these enter into the estimate of total tonnage required is obscure.

Obviously at present it is a guess, at best, even on the part of the government to measure how far it will draw ultimately upon the steel works for material. The length of the war and the degree to which the country is compelled to engage in active hostilities will dictate in the end the amount of steel that may be needed. Experience of the European nations which have been in armed conflict for two and a half years is illuminating in showing how far original calculations in materials and men fell short of the actual necessities.

Steelmakers today are finding no trouble in selling in the open market all the plates they can supply at not less than 6c per pound on the average. Similarly they can readily dispose of their structural shape and bar tonnage at 3.75c to 4c per pound. For huge tonnages of shell bars European nations have paid 4c to 4.25c per pound. At the agreed price of 2.90c per pound on plates, the government is effecting an economy over the actual market of not less than $60 a ton; at 2.50c per pound on shapes and bars, the concession represents about $30 per ton. Plates are likely to figure heaviest in the government's specifications.

On the present indefinite estimates of requirements, the steel producers have given to the maker the equivalent of close to $25,000,000 in actual value. If the war is protracted, this vast sum will grow by leaps and bounds.

recent declaration of war is receiving the loyal support of men in all walks of life. A number of the leaders of the iron and steel and affiliated industries who hold commissions as reserve officers expect to assume their duties shortly training the new army corps. Many others, who have had some training in summer camps and aboard naval vessels, are making efforts to pass examinations for commissions in the regular army. In the Youngstown district, Capt. J. A. Freed, head of the employment bureau of the Carnegie Steel Co., has offered to enter the recruiting service. L. J. Campbell, vice president of the Youngstown Sheet & Tube Co., has already secured a commission in the officers' reserve corps. Capt. George E. Street, who is organizing an engineer corps, has received applications for service from 51 technically trained men, largely from the iron and steel plants. Capt. Street formerly was efficiency electrical engineer for the Sheet & Tube company. John Stambaugh, second son of John Stambaugh, treasurer of the Brier Hill company, is a second lieutenant in a troop formed to join the Ohio cavalry regiment. Dr. S. S. McCurdy, physician and surgeon for the Sheet & Tube company, has been given a commission in the medical reserve corps and has asked to be transferred to a base hospital being organized in Youngstown. The movement to establish this hospital is fostered by J. A. Campbell, president of the Sheet & Tube company, who is collecting $50,000 largely from iron and steel manufacturers, individuals and companies.

Breaks Steel Record

Open hearth steel department No. 4 of the Homestead Works of the Carnegie Steel Co., Munhall, Pa., in March established what is believed to be a world's record in the production of steel. A battery of 14 furnaces, including 10 60-ton and four 75-ton furnaces, produced 84,472 tons of steel during the month. This output surpasses the previous record of the department by more than 12,000 tons, according to A. A. Corey, superintendent of the works.

Pittsburgh is Loyal

Equal activities are noted in Pittsburgh, where every effort is being made to assist the government in preparing for war. George A. Burrell, consulting engineer, is mobilizing the nation's technical forces to devise methods for combating poisonous gases. Mr. Burrell has been connected with the United States bureau of mines and has been commissioned a major in the army. Ensign Charles McKenna Lynch, Greensburg, Pa., son of the late Thomas Lynch, president of the H. C. Frick Coke Co., has joined the colors at Philadelphia. He was graduated from Annapolis in 1907.

A regiment of reserve engineers is being organized under the direction of Col. Edgar Jadwin, in charge of the United States army corps of engineers at Pittsburgh. Virtually every engineer in the Pittsburgh district has volunteered his services. The regiment will consist of two battalions of three companies each. Among those of the iron and steel and allied industries who have received captain's commissions are: E. K. Hiles, secretary of the Engineers' Society of Western Pennsylvania; P. M. Lincoln, electrical engineer, Westinghouse Electric & Mfg. Co.; E. A. Gibbs, McClintic-Marshall Co.; and E. B. Butchers, American Bridge Co. Those who have been accepted as first lieutenants are: F. T. Leilich, Union Switch & Signal Co.; J. A. Armington, C. N. Bell and B. B. Anderson, American Bridge Co. The second lieutenants are: J. M. Arovitch and P. M. Ploss, American Bridge Co.; R. P. Pennoyer, Carnegie Steel Co.; and T. D. Graham, Bourne-Fuller Co.

Reports from all the industrial centers in the country indicate the same prevailing enthusiasm. Edward Gol-

(*Continued on Page* 820.)

Steel Ingot Output in First Quarter

THE steel furnaces of the country during the first three months of the year operated nearer to capacity than the blast furnaces. The delays resulting from deferred deliveries of raw materials, coupled with those arising from traffic conditions, proved a greater barrier to the pig iron producer than to the steelmaker.

The accompanying tables reveal clearly the operations of two-thirds of the independent steel furnaces of the country during the first quarter. Supplementary figures received by *The Iron Trade Review* during the past few days enable the steel ingot production records of 68 per cent of the independents to be shown. All of the companies had not been able to forward their March production records up to the time of going to press, so that the third table reveals the March figures already received, with a comparison of the production of the same companies in February.

Taking January as the base, or 100 per cent, pig iron production in February dropped to 93 per cent. An 11 per cent gain last month brought the March rate to 103.2 per cent of that in January. In steel ingot production, the February rate was 98.2 per cent of the January, and the March rate 106.9 per cent.

The January output was 1,125,711 gross tons, or at an average daily rate of 36,313 gross tons. The February output was 998,192 gross tons, an average daily rate of 35,650 gross tons. The March records received to date show an output of 916,450 gross tons, or an average daily rate of 29,563 gross tons, against 760,346 gross tons in February by the same companies.

The ingot production dropped off 1.8 per cent in February, but in March gained 8.9 per cent over February. Pig iron production declined 7 per cent in February, and gained 11 per cent in March over February.

Steel Ingot Output

FIGURES FURNISHED BY 68 PER CENT OF INDEPENDENTS.

	January.
Basic open hearth ingots	872,872
Acid open hearth ingots	44,542
Bessemer ingots	202,971
Electric furnace ingots	5,326
Total	1,125,711

Steel Ingot Output

FIGURES FURNISHED BY 68 PER CENT OF INDEPENDENTS

	February.
Basic open hearth ingots	771,649
Acid open hearth ingots	38,277
Bessemer ingots	183,351
Electric furnace ingots	4,915
Total	998,192

Steel Ingot Output

IN MARCH, OF COMPANIES REPORTING TO DATE, AND OF SAME CONCERNS IN FEBRUARY.

	Mar.	Feb.
Basic O. H. ingots	692,687	568,663
Acid open hearth ingots	27,824	23,653
Bessemer ingots	191,135	164,567
Elec. furnace ingots	4,804	3,463
	916,450	760,346

Scarcity of Steel Plagues Britain

Munition Makers Among Those in Trouble to Get Supplies—American Rods Offered at $139.20 and Billets at $115.20 But Buyers Hold Off —Pig Iron Active With Official Advance Likely

Bureau of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., March 28, 1917.

Scarcity of steel appears to be more troublesome, and a great deal of offered business cannot be accepted. Even makers of munitions find it difficult to obtain the requisite steel. Certain Birmingham merchants for weeks have been sending out inquiries, and generally with the result that manufacturers decline to quote. Many consumers of billets are obliged to be content with defectives, of which a few are offered. American material is more difficult to obtain, and is gradually disappearing from the market. Some buyers of wire rods received an offer a few days ago f American rods at £29 ($139.20) per ton, while ordinary billets are quoted at £24 ($115.20). Such prices may be accepted later, but at present they are not attracting buyers.

Makers of finished iron are offered a large amount of business, generally to renew expiring contracts. The manufacturer usually declines this business, being so heavily booked. Many manufacturers could take on four times their capacity. Apparently, the government is buying as freely as ever. Sheets and strip are in great demand for a variety of purposes, especially in Birmingham. The sheet trade generally is greatly hampered by a lack of mild sheet bars and puddled iron. The galvanized sheet trade is very nearly negligible. Its falling off is fairly represented by the Board of Trade returns.

The enormous demand for shipbuilding material affects chiefly the great steel works in Glasgow and the west of Scotland. These makers are running to utmost capacity, without being able to meet the demand.

Pig Iron Active

The market for raw material has shown great activity. In the north of England consumers are better satisfied by prompter deliveries. Makers are not keen to book forward business, while they impose upon consumers the condition that contracts are subject to any change in official prices. Buyers in that district, and in the Midlands also, have been rather confident that no changes are to be looked for. There is apparently less foundation for this view than a fortnight ago. Informal consultations again have taken place as to the question of applying for a rise in the minimum rate. A very strong opinion favors an application to the Ministry of Munitions for an advance of 5 shillings ($1.20) per ton. The stimulus in this direction comes largely from a sharp increase in the cost of fuel together with a rise in the value of other materials. There is growing dissatisfaction as to the increasing gap between the price of pig iron and puddled bars. The smelter considers himself hardly dealt with when he is limited to 90 shillings ($21.60) per ton for Staffordshire common iron, out of which the iron master can produce puddled bars selling as high as £12 10 shillings ($60.00). The position, in fact, is out of all proportion to anything previously known in the trade.

Pig Iron in Demand

All brands of pig iron easily realize maximum figures and material goes immediately into consumption. There has been an increase in the production of basic iron. It is thought the decided improvement both in price and demand for ordinary irons very largely is connected with the diverting of a number of furnaces to the production of basic iron. Two furnaces in Derbyshire have been added to the basic list and others are likely to follow. Staffordshire furnaces are not likely to be included among the makers of basic, in view of the very large demand for all classes of Staffordshire iron. Foundry iron is in heavy demand for war purposes and there is a brisk inquiry for best cold blast iron for the production of chilled castings. The roll trade continues especially active. East Coast hematite is very much sought for steel-making and in some quarters there are complaints of a shortage of Spanish ore, due in some measure to a lack of shipping. Business is a good deal restricted by the scarcity of trucks and the labor question continues troublesome. Very much more material now could be sent abroad if the tonnage were available. The Italian government is inquiring freely. The total Middlesborough stocks are 2,200 tons, compared with 77,000 a year ago. For every description of pig iron, including Northampton, it has been found possible to secure full prices.

The Russian revolution took the bulk of people in this country completely by surprise, though for some time past there has been an uneasy feeling here that Russia was not rising to her capacity. The Germans may get what comfort they can out of the Board of Trade returns for February, the month of "unrestricted" submarine warfare. Allowing for the fewer days in February as compared with January, the net reduction appears to be about 10 per cent in imports. There is an increase over the imports of last year of 5.36 per cent, and of exports 2.62 per cent. While it is obvious the submarines to some extent have checked business, there is no decrease that cannot be fully accounted for by the government's regulation of certain imports and exports and the prohibition of others. The quantity of iron and steel and manufactures exported was 183,149 tons against 277,704 tons last year. A most striking reduction is that of galvanized sheets, the exports of which were 1,799 tons, compared with 14,334 tons. There are substantial increases under the heads of pig iron, bars and shapes, wire, black sheets, wrought tubes, steel blooms and billets, but decreases in castings and forgings, in rails which were considerably less than half the tonnage of a year ago, in plates, sheets and black plates. The military situation continues encouraging. All Englishmen welcome the multiplying evidences of solidarity of feeling between themselves and their kinsmen on the other side of the Atlantic. Although no figures are permitted, there is plenty of evidence that recruiting continues to go forward with vigor.

Handles Slag Tonnage

The Standard Slag Co., Youngstown, O., handled approximately 750,000 tons of slag from blast furnaces in western Pennsylvania and Ohio during 1916. The capitalization of the company recently was increased from $250,000 to $550,000 and $150,000 preferred stock is being issued. Proceeds of the stock will be employed in purchasing new equipment and providing an ample working capital. The company hopes to handle 1,000,000 tons of slag during the present year with the increased facilities. Besides the Youngstown plant, the company also operates plants in Sharpsville, Pa.; Ironton, Leetonia, Jackson, Hubbard and Canal Dover, O. The slag products are used in road building.

MEN OF THE IRON TRADE

Who they are **Where they are** **What they are doing**

H. P. ROBY, for the last four years manager of the Pittsburgh office of the Bourne-Fuller Co., Cleveland, has tendered his resignation, effective April 15, to become assistant secretary and assistant treasurer of the Interstate Pipe & Cordage Co., the Oliver building, Pittsburgh. Mr. Roby has been identified with the Bourne-Fuller company for 13 years, and has been connected with the Pittsburgh office for 11 years. After being graduated from Cornell University in 1904, he joined the engineering department of the Wellman-Seaver-Morgan Co., Cleveland. Thomas D. Graham has been appointed successor to Mr. Roby. Mr. Graham has been connected with the Bourne-Fuller Co. for about seven years. He has been in the sales department at Pittsburgh for five years. He holds a commission in the reserve officers' corps of the United States army.

J. M. Studebaker Jr. has been elected to the board of directors of the Studebaker Corporation, succeeding his father.

H. F. Dunbar, formerly of the raw material department of the Midvale Steel Co., Philadelphia, has entered the employ of Park & Williams, Real Estate Trust building, Philadelphia.

Henry Haab, for 15 years mechanical engineer of the Seth Thomas Clock Co., Thomaston, Conn., has resigned to accept a similar position with the Sessions Clock Co., Bristol, Conn.

Louis Knapp has resigned as superintendent of the foundry department of the Haskell & Barker Car Co., Inc., Michigan City, Ind., to accept a similar position with the Chicago Malleable Castings Co., Chicago.

H. G. Schaefer, formerly connected with the Technical Supply Co., Scranton, Pa., has been placed in charge of the sales department of the Economy Drawing Table Co., Toledo, O., maker and designer of drafting room furniture.

Dr. John A. Brashear, Pittsburgh scientist, Ambrose Swasey, of the Warner & Swasey Co., Cleveland, and J. R. Freeman, hydraulic engineer, have returned from the orient. They visited Japan, China, Siberia and Manchuria.

J. W. Dopp, 1420 Dime Bank building, Detroit, formerly identified with the International Molding Machine Co. as Michigan representative, is now handling the line of molding machines and foundry equipment manufactured by Henry E. Pridmore, Chicago, in the same territory.

Harry W. Goddard, president and treasurer of the Spencer Wire Co., Worcester, Mass., has made a handsome gift to the Home for Aged Men of that city for a building to be

H. P. ROBY

erected in memory of his father, Dorrance S. Goddard, a pioneer wire maker of Worcester.

Emery Vose, formerly mechanic for the American Steel & Wire Co., Waukegon, Ill., has been promoted to the office of assistant superintendent of the De Kalb, Ill., mills. Mr. Vose has been connected with the American Steel & Wire Co. in the Waukegon mills for nearly 20 years.

J. E. Davidson, Bay City, Mich., was elected a director of the Superior Ship Building Co. to fill the vacancy caused by the death of J. C. Wallace. At a recent meeting of the American Ship Building Co., in Cleveland, A. G. Smith, Lorain, O., was also elected a director to succeed the late J. H. Hoyt of the Chicago Ship Building Co.

Frank C. Cutler, sales manager and director of the Worcester Pressed Steel Co., Worcester, Mass., has resigned and accepted the positions of secretary and sales manager of the Worcester Stamped Metal Co. in the same city. He has been succeeded in his former place by H. P. Harris, of the Bull Engineering Co., Baltimore.

C. H. Newcomb, resident manager at Philadelphia for Crocker Bros., New York, has just returned to his office in the Pennsylvania building, Philadelphia, after recovering from an attack of pneumonia. He spent considerable time convalescing in North Carolina.

Alfred H. Wyman, Worcester, Mass., has been selected by the Carnegie Steel Co. to supervise its extensive welfare work among its 24 plants in Pennsylvania and Ohio. He will make his headquarters in the Carnegie building, Pittsburgh, and will begin his duties about May 1. From 1913 to Jan. 1, 1917, Mr. Wyman had charge of the company's welfare work in Homestead, Pa.

Alvah S. Chisholm, assistant to the president, American Steel & Wire Co.; E. C. Henn, vice president and general superintendent, National Acme Mfg. Co.; John G. Jennings, vice president and treasurer, Lamson & Sessions Co.; Samuel Mather, Pickands, Mather & Co.; and F. W. Ramsey, president, Cleveland Foundry Co., have been elected directors to the Cleveland Chamber of Commerce.

C. C. Phillips, traffic freight agent of the Union Pacific railway, recently was elected president of the Pittsburgh Association of Freight Traffic Agents. H. C. Mitchell, of the St. Joseph & Grand Island railroad; J. L. Chapman, of the Southern Pacific railroad; and F. G. Schultz, of the New York Central lines, were elected vice presidents, and A. R. McCormick, of the Southern railroad, was elected treasurer of the association.

A. G. Oakley, sales representative of A. A. Hilton Co., Smith building, Seattle, is making an extensive trip through the east for the purpose of establishing closer purchasing relations with iron and steel producers. Mr. Oakley states that owing to the revival in steel and wooden ship building, business is flourishing in the Pacific northwest. The war, he believes, will stimulate business rather than retard it.

Steel Men Join Colors

(*Continued from Page* 817.)

tra, president of the Republic Steel Co. and Democratic committeeman from Missouri, and his two sons have offered their services to the government. J. H. Steedman, vice president of the Curtis Mfg. Co., St. Louis, has been accepted as first lieutenant in the Missouri naval reserve. Murray D. Morton, son of Joseph Morton, sales manager of the Domhoff & Joyce Co., Cincinnati, has joined Ohio Troop F.. Nearly all the officials and the official force of the Jeffrey Mfg. Co., Columbus, O., have joined the militia. J. Walter Jeffrey is a lieutenant of Troop B, a Columbus cavalry unit which has recently returned from duty on the Mexican border. Harry E. Duff, Cleveland, sales representative of the American Sheet & Tin Plate Co., has sent a letter of application to the office of the adjutant general of the war department. Mr. Duff received his training at the University of Tennessee when that institution was second only to West Point as a training center.

Organize Munition Board

Frank. A. Scott, vice president and treasurer of the Warner & Swasey Co., Cleveland, has been made chairman of the newly-created munitions board, created by the council of national defense. Besides Mr. Scott, the civilian members are: Bernard M. Baruch, Howard E. Coffin, Julius Rosenwald and Dr. Franklin Martin. The army members are: Brig. Gen. Thomas Cruse, Cols. F. G. Hodgson and H. Fisher, Lieut. Col. J. E. Hoffer, Majors P. E. Pierce and Charles Wallace, and Capt. A. B. Parker, and from the navy, Rear Admirals H. H. Rosseau and W. S. Capps, Commanders R. H. Leigh and T. A. Kearney, Dr. R. C. Holcomb, Paymaster J. H. Hancock and Lieuts. W. B. Lamly and L. McHowe.

Forming Sheet Company

A company to erect a six-mill sheet plant near Leavittsburg, O., is being organized by Edward Clark, son-in-law of Jonathan Warner, president of the Trumbull Steel Co., Warren, O. Details of the project are being withheld at the present time.

Munitions Plant Wrecked

A series of explosions, which started in the time fuse department practically destroyed the shrapnel plant of the Eddystone Ammunition Corporation, Eddystone, Pa., April 10, and killed more than 100 munitions workers. Rumors that the disaster was the result of plots have not been confirmed. The Eddystone plant was built and put into operation as a munitions factory by the Baldwin Locomotive Works. Last September it was taken over under the present name by a commission representing the Russian and English governments.

Buys Spiegeleisen

Pittsburgh, April 11. (By wire.)—A steel company in western Pennsylvania has closed for 5000 tons of spiegeleisen for delivery through the remainder of the year at about $75, furnace, which now appears to be the minimum price. An inquiry is pending for 200 miles of 4-inch [illegible] pipe for the southwest, involving 5,500 tons. A Pittsburgh tankmaker has sold tank steel from stock at 10 and 11 cents.

Tonnage at Record

New York, April 11. — Previous records of unfilled tonnage of the United States Steel Corporation again have been shattered by the report as of March 31, which showed 11,711,644 tons, an increase of 134,947 tons during the month.

Machinery Merchants, Inc., New York, have leased the store at 168 Center street.

Warehouses Advance

Detroit, April 10.—An advance of from $3 to $5 a ton on most products in store prices is announced by leading Detroit jobbers. Plates and hoops are unchanged. The new schedule lists iron and steel bars at 4.25c; shapes, 4.50c; plates, 5.50c; No. 10 blue annealed sheets, 5.75c; No. 28 black sheets, 5.90c; No. 28 galvanized sheets, 8c, and hoops, 4.75c, base.

Stores Advance Plates

Chicago, April 10.—Chicago warehouses have advanced steel plates to 6c, effective today. At St. Louis the new quotation will be 6.05c, and at St. Paul, 6.10c. Round head rivets from store have advanced to 5c, Chicago.

Wide Plates High

Buffalo, April 10.—Independent interests are asking as high as 7c for plates. The schedule is from 6.60c to 7.50c. The later price applies to plates over 78 inches in width. Bars are quoted at 4.40c, and structural shapes at 4.60c.

Metal Trades to Meet

The nineteenth annual convention of the National Metal Trades Association will be held on April 25 and 26, at the Hotel Astor, New York City.

The Non-Ferrous Metals

Copper **Lead** **Spelter** **Tin**

New York, April 10. — Pending definite knowledge of the extent of the government's purchasing activities, the metal markets have been weak and unsettled this week. The improvement in traffic conditions, aiding shipments from mines, smelters and refineries has also been a factor toward lessening the strained position of prices which existed a few weeks ago.

In the copper market, current prices have been established principally in sales of comparatively small lots by resellers. Present quotations for electrolytic copper are as follows on the basis of cash, New York: Prompt, 33c; April, 32.75c; May, 32.50c; June, 31.75c; third quarter, 29c to 30c. Prime lake is quoted 33c for prompt shipment. Casting is quoted 32c.

The spelter market has eased off perceptibly the past week. Production continues large, while consumers are holding off, with the result that competition among sellers has brought much price shading. Prime western quotations, St. Louis basis, are about as follows: Prompt shipment, 9.62½c to 9.75c; May shipment, 9.25c to 9.50c; second quarter, 9c to 9.12½c. Brass special continues to command a premium of about ½c to ⅝c over prime western. High grades range from 16.50c to 17.50c.

Fairly good business has been closed in lead, but prices have gradually declined. Outside sellers are asking as low as 9c, St. Louis, and 9.25c for spot shipment New York. Quotations in the outside market follow: Prompt and April shipment, St. Louis, 9c to 9.12½c; May, 8.92½c.

The aluminum market is quiet but firm, with a fair inquiry in the aggregate from the consuming trade. Prompt carloads may be quoted as follows: No. 1 virgin, 60c to 62c; No. 1 remelted (98 to 99 per cent) 59c to 60c; No. 12 remelted, 41c to 43c.

Several sales of spot antimony have been made the past week at around 36c ex-New York warehouse. All positions have been active, up to and including May shipment from the far east, and prices have advanced rather sharply. Quotations follow: Spot, 35.50c to 36.50c; February shipment, 23c to 24c; March, 16.50c to 17c; April, 14.75c to 15c; May, 13.75c to 14c.

(*For complete prices see page* 854.)

Fabricating Metal Office Furniture

Manufacturing Steel Desks, Filing Devices, Lockers, etc. Has Become a Highly Developed Branch of Industry in Which Proper Design, Adequate Equipment, and Efficient Methods of Operation are Required

A FINE example of American progress is witnessed in the steel-equipped office, whose neatness, durability and service require no elaboration. The protection of letters, cards and records from fire, water and theft deserves careful consideration, and, naturally, steel office cabinets and filing devices give a high degree of security. Originally, the manufacture of such products was a made-to-order proposition, but the business has expanded so greatly that now most manufacturers keep a large stock on hand so that orders for standard articles may be readily filled.

Making steel furniture and office fixtures involves a number of interesting fabricating problems, and the methods employed at the plant of The Van Dorn Iron Works Co., Cleveland, are noteworthy because they are the accumulative result of 25 years' experience. The Van Dorn products, in the metal furniture line, include filing cabinets in the usual varied styles and sizes, card cases and trays, desks, tables, stands, chairs, waste baskets, desk trays, steel shelving, clothes lockers, etc.

From the standpoint of tonnage

FIG. 2 — LARGE PRESS WHICH PERFORMS FOUR OPERATIONS

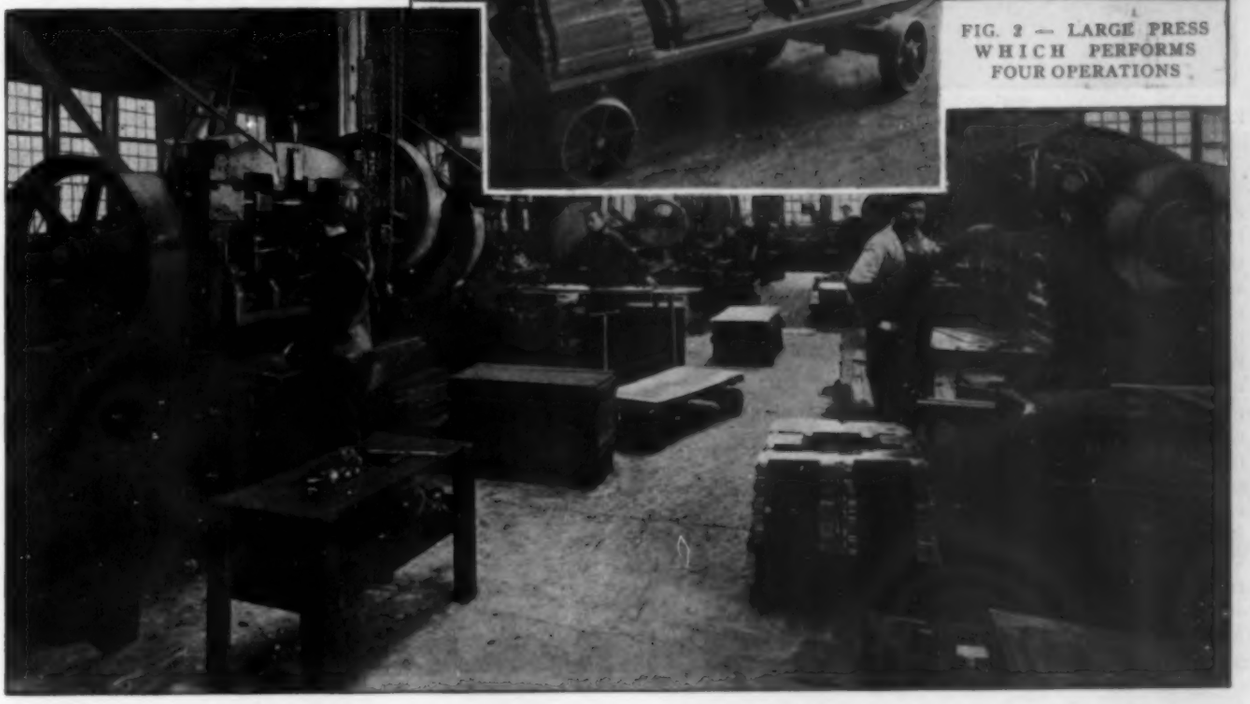


FIG. 1—LOOKING DOWN AN AISLE BETWEEN TWO ROWS OF PRESSES IN THE MACHINE ROOM OF THE VAN DORN IRON WORKS CO.

FIG. 3—A CORNER IN THE ELECTRIC WELDING DEPARTMENT

FIG. 4—WELDING CABINET CORNERS WITH THE OXY-ACETYLENE FLAME

consumed, sheets form the principal raw material used. The steel used in the manufacture of furniture, known as "metal furniture stock", is cold rolled, re-annealed, pickled, open hearth stock, which is re-rolled at the plant to take out any buckles which may have been incurred in transit or by handling. Steel for lockers is distinguished from metal furniture stock, the former being simply cold rolled sheet steel. Light and heavy gage sheets, ranging from No. 26 to No. 8, are sorted in the warehouse according to size and gage. Long bars and angle iron are stored on a series of racks according to size. A storeroom on a mezzanine floor overlooking the machine and layout rooms is utilized for stocking small parts such as bolts, nuts, latches, handles, hinges, lock plates, lugs, brass and bronze tubing and bars, and other parts. The warehouse and storerooms are connected by convenient runways and elevators to the other departments so that materials may be easily transported.

The size and shape of blanks for the various parts of furniture is determined in the layout department which occupies part of the mezzanine floor overlooking the machine room. Here a force of mechanics make the patterns for the parts of the products manufactured. All patterns are made of heavy-gage steel and are stenciled according to name and number so that they may be readily identified. The layout department is one of the most important parts of the shop and the fact that the company makes a varied line of standard products, the parts of which are interchangeable, calls for great accuracy in the pattern work.

The sheets are sheared in machines in the machine room, part of which is shown in Fig. 1. After they have been cut to size and shape, they are removed to the punch press and stamping department, where they are punched, notched and cut, and bent and shaped as required. All these operations are done on special machines and dies. The press shown in Fig. 2, built by the E. W. Bliss Co., Brooklyn, N. Y., when engaged on stamping locker bottoms, forms a complete bottom in one operation, with the exception of punching the necessary holes. What is now done at one stroke of this machine formerly was the result of four distinct operations. From the machine room, the parts are taken to one of the four first assembly, or case making, rooms where the initial assembling begins.

As already indicated, parts for assembling are made on special machinery and dies, with the object of making parts of similar type interchangeable. This method of manufacture requires accurate dies and necessitates the maintenance of machines in good working order at all times. The die and machine repair work is performed in a well equipped machine shop, in which punches, dies, etc., are stored on shelves where they may be easily found when required for a particular job.

Extensive Welding Employed

The machine-shaped parts are taken to the first asembly department, where they are put together to form the various Van Dorn products. In assembling, oxy-acetylene and electric welding is extensively employed. In general, the gas method is used in welding cases at the corners and joints, thereby producing practically a one-piece case. Desk and locker legs, and other parts joined in a seam, are welded by the gas flame. The apparatus made by the Oxweld Acetylene Co., Newark, N. J., is employed throughout, and an illustration of oxy-acetylene welding is given in Fig. 4, where the corners of a filing cabinet are being welded.

Electric welding is used for spot work and is employed in place of bolts, nuts and rivets whenever possible. Electric welding machines manufactured by the Toledo Electric Welder Co., Cincinnati; the Winfield Electric Welding Machine Co., Warren, O., and National Electric Welder Co., Warren, O., are used. Fig. 3 illustrates the electric welding of legs to a cabinet base.

After being welded, the assembled pieces are smoothed up at the welds by hand filing and by grinding with portable electric grinders. After the first assembly the product is ready for the enameling department, and, in general, the first assembly precedes enameling. In locker manufacture, the doors, sides, tops, etc., are enameled and then assembled. Before being sent to the enameling department, all assembled cabinets, cases or whatever the products may be, are inspected and checked up against drawings by inspectors.

Methods of Enameling

The enamel is applied to the metal by spraying, dipping, or brushing. None of the metal furniture or office filing equipment is dipped; it is all sprayed for the first coat and thereafter brushed. Lockers are dipped. Before enameling by any method, all metal products are cleaned by rubbing with garnet paper and then wiped down. In the spraying process, the enamel, the standard color

of which is olive green, although special colors are also applied, feeds by gravity from a pail suspended from the ceiling, through a hose, and into a nozzle. Compressed air under 60 pounds pressure breaks the liquid up into a fine mist, and it is shot out of the nozzle in the form of a spray. The operator directs the nozzle so that the article to be enameled is covered with a thin coat.

The spraying cabinet consists of an enclosure with the front side open and equipped with two powerful exhaust fans, placed in the rear wall and connected by a pipe to the outside air for removing the excess spray and fumes. Articles to be enameled are mounted on a stand in the center of the enclosure and are sprayed. When one coat has been applied, an article or several articles depending on their size and shape, are placed on steel trucks and wheeled into the baking ovens. Where dipping is done to apply the first non-rusting coat, the pieces are dipped by hand in large, deep enamel vats and are then hung up to drip, the excess enamel falling on a drain board and then running back into the vats. When the excess has dripped off, the pieces are hung up in the baking ovens to dry. Dipping vats with baking ovens at the right are shown in Fig. 5.

A neutral tone of olive green is the shade most favored for enameling, but maroon for mahogany finish as well as browns for oak and walnut are used. Regular wood graining is done when it is desired to match woods already in an office or for special reasons. This is all hand work.

The enamels are well baked so that the finished product appears as though the enamel were an integral part of the metal. The enamel is baked at from 150 to 250 degrees Fahr. for 3.5 hours, on the average, but time and temperature vary with the nature of the enamel, the number of coats and the method of application. For instance, sprayed enamel forming an extremely thin, even coat requires a lower temperature than does dipped enamel. Articles sprayed with olive green enamel are baked at about 180 degrees Fahr., while those dipped in the same color are baked at a temperature 10 degrees higher. Sprayed mahogany enamel is subjected to a temperature which is approximately 230 degrees Fahr. The baking equipment consists of a battery of 16 gas-fired ovens arranged back to back in two rows of eight. The time of starting a bake is recorded on a card kept on the oven doors, so that the man in charge can readily tell how the procedure is progressing. When fine office cabinets and furniture are being enameled, the first coat, when dried, is rubbed down with garnet paper, and the second coat is brushed on by hand. Filler is applied prior to the first coat. The second coat is then baked, and the dried surface is rubbed with emery and oil, as shown in Fig. 6, to produce a desirable dull finish.

FIG. 6—FINISHING CABINETS BY HAND

FIG. 5—A BATTERY OF BAKING OVENS—THE DIPPING VATS ARE SHOWN AT THE LEFT

Special methods are employed to produce imitation wood effects in mahogany, oak and walnut.

After an article has been enameled and rubbed, it is sent to the final assembly room. Here, the bronze fittings such as handles, lockers, label holders for indexes and filing cabinets, linoleum tops for desks and tables, and other parts required to complete the article are atttached. A corner in the final assembly room is illustrated in Fig. 7, where filing cabinets are being finished. Handles and other small parts needed for giving the final finished appearance to the products are cast in the bronze foundry department. The melting equipment consists of two coke-fired crucible pots, and a considerable percentage of the total number of bronze parts needed are produced here.

For giving special finishes to the cabinet and furniture fittings, an electroplating room is employed. Here, copper, nickel, and other plating work is done and oxidized finishes are produced when required. The cast or stamped parts are plated and then buffed and polished. Sherardizing the steel extension slides for filing cabinets is also performed in the electroplating room.

After the final assembly, the articles are inspected and, if up to standard, are placed in stock to be billed out on orders. The final locker assembly is especially interesting. Locker parts, including sides, doors, ends, bottoms, etc., are in three widths, three depths and two heights. From this assortment, 30 sizes and two styles of lockers may be assembled by selecting the parts required. Lockers are assembled by bolts and nuts and they are shipped either assembled or "knocked-down". The crating of metal furniture for shipment presents a problem which the Van Dorn company has solved by wrapping the articles in heavy felt and crating them securely in wooden crates.

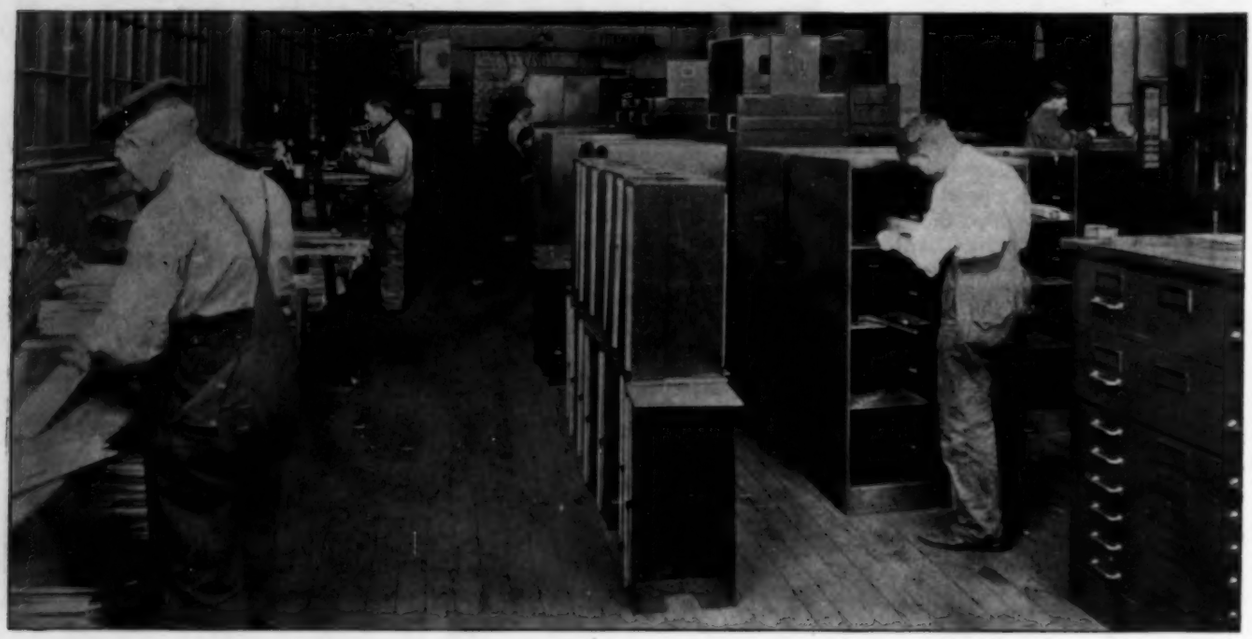


FIG. 7—A VIEW IN THE FINAL ASSEMBLY ROOM SHOWING WORK ON CABINETS

Service Retirement Plan

The Colorado Fuel & Iron Co. has announced the adoption of what it calls the "Service Retirement Plan". According to the provisions of this plan all male employes and officials of 65 years of age, with the exception of the president, and female employes of 55 who have given their entire time to the interests of the company or its subsidiaries may be retired after 20 years' service. After 30 years' service men of 60 and women of 50 may be retired. In order that all employes engaged after the inauguration of the plan may be able to render 20 years' service before the age of 65 the age limit for new employes has been fixed at 45.

The regular retirement payments are 30 per cent of the average pay per month during the ten years of service just preceding retirement, with a minimum of $20 a month. Credit is given for all the time the employe is on the payroll, even though the service has not been continuous.

The service retirement plan is in charge of a service retirement board consisting of the following officers, who were appointed by the president and approved by the board of directors: C. J. Hicks, executive assistant to the president; J. Chilberg, vice president and manager of sales; S. G. Pierson, vice president and general purchasing agent, and F. H. Bentley, auditor.

All men of 65 and women of 55 shall be retired, unless by special dispensation of the board they are permitted to continue their employment. Men and women of 60 and 50, respectively, may be retired at their own request or at the discretion of the board. Employes incapacitated after 15 years' service, or employes of advanced age, who have been at least 20 years in the service of the company, may at the discretion of the board be retired and given special allowances. If the retirement board thinks best these allowances may be continued to widows and orphans for a limited period of time. As the allowances are purely voluntary, they are not liable, before payment, to claims of creditors or to any attachments or executions for debts of the beneficiaries.

After having been retired, an employe cannot re-enter the service of the company, although he is not barred from seeking employment in any business not prejudicial to the company. Violation of law, misconduct, etc., will be considered reason for discontinuing or suspending the allowance, although in some cases another member of the beneficiary's family might be made the payee.

The American Foundry in War Time

Foundrymen in This Country May Profit by the Experience of French Shell-makers—Slip-Shod Methods Can Not Be Tolerated in the Manufacture of Effective, Reliable Munitions

BY EDGAR ALLEN CUSTER JR.

IN THE summer of 1914, when the great European powers suddenly found themselves face to face with the stupendous task of not only raising and equipping huge armies, but of keeping them constantly supplied with the necessary munitions of war, they proceeded, as systematically and deliberately as the mad rush of events permitted, to organize their industries to the highest possible point of capacity and efficiency. Not only did they tax their own capacity to the utmost but they called upon all the outside help available. Tremendous orders were placed here in America for all sizes and varieties of shells, shrapnel, fuses, and other military stores. We in turn swung our industrial organizations as rapidly as possible into line for high pressure production. Huge tracts of land were plowed up and concrete foundations sprung up, almost overnight, the forerunners of buildings of a size and capacity hardly even dreamed of before. The country was combed from coast to coast for the necessary machines to equip the new shops and every machine tool builder suddenly found himself confronted with his dream of dreams, gigantic orders to be had for the taking.

The Tide of Fortune

The tide of fortune swung on to the foundries and they in turn bent every effort to the task of satisfying the insistent demands of their customers. Patterns for machine housings were swung into the pits while the sand was still hot from the housing pulled out but a short time before. Night gangs were put to work cleaning up and preparing for the day force. In many cases buildings were enlarged. Sheds and outbuildings were constructed around the foundry for overflow molding operations. Every effort was made to meet the sudden demand.

In Europe the same scene was being enacted, more grimly and earnestly perhaps and with the knowledge that their very existence hung in the balance, yet probably with no greater individual effort. The far famed German preparedness and efficiency had, no doubt, foreseen and provided for every detail even to the precise quantity and grade of each type of casting in each foundry. Conditions in France, England and other countries, however, more closely resembled our own state of affairs, each foundry working to its utmost but with a lack of unity and co-ordination so characteristic of the foundry trade. Each shop produced according to its own methods. Some specialized on heavy castings. Some turned to light work, as their equipment dictated. Various shops used widely different brands of iron for similar work. All were guided solely by the aim to produce in quantity and have sound, strong and easily machined castings, and at first their product was satisfactory.

But as the war assumed greater and greater proportions a new phase began to make its appearance in the foundries. When the first great drives through Belgium and France had come to a standstill and the armies were deadlocked, each protected in endless miles of trenches, the artillery developed into the determining factor. The famous and terrible curtain of fire made its appearance, necessitating the rapid use of great quantities of large and small caliber guns. Every assault upon a trench was dependent upon the artillery preparation that preceded it, during which the concentrated fire from many guns literally blasted the trenches out of the ground and devastated the country for miles.

This meant an unceasing supply of projectiles in quantities incredible were it not for the results obtained, and necessitated not only a higher rate of production on the part of the manufacturer but rigid economy if it were to be maintained for any length of time.

As the deadlock wore on week after week it became more and more evident that victory would finally depend upon exhausting the enemy's resources and in an effort both to conserve resources by reducing the cost and to increase the rate of production, the cast-iron shell made its appearance. The first indication were fragments of German shells, picked up on the battlefields of France. They were unquestionably cast iron. Little attention was paid to this phenomenon at first, since cast-iron shells are by no means new. Every country used them more or less for target practice, and it was argued that the Germans were hard pressed and were down to the extremity of using their dummies and target practice shells in active service. But Germany proved far from exhausted and as their guns returned shot for shot, the cast iron shell became an everyday occurrence and, contrary to most beliefs and opinions, observations seemed to prove them just as efficient as the steel shell.

From no less authentic sources than the official French inspectors and from men high in financial and commercial circles, lately returned, we get the story of France's struggle, crowned with final success, to produce a cast iron shell that would measure up to the stringent French requirements. Quick to appreciate the possible economies and the advantages of an increase in the rate of munition production, the French foundries were called upon to produce cast iron shells and solve the problem of meeting chemical and physical requirements calculated to give a shell no less efficient than the steel shell. The exact details may be withheld until long after hostilities have ceased, but many accounts of losses of total heats and 50 and 75 per cent rejections and the final adoption of mixtures identical with our semi-steel, indicate that the struggle must have been difficult and costly.

American Foundries Should be Ready

With our own country today facing the crisis of her history and with the grave realization that, while highly improbable, it is by no means beyond the bounds of possibility that the safety of the nation may rest upon our manufacturing ability, it is well that our foundries be prepared to do their part. Should the demand for shells become so great or the pressure of needed economy so powerful, that we also should turn to the foundries for help it would be everlastingly to their credit if they were able at once to produce a satisfactory product.

The production of cast iron or semi-steel shells presents difficulties that heretofore few if any foundries have been called upon to meet. Not only must they withstand fracture, but they must also behave properly when fractured. Sufficient resistance to impact must exist to prevent fracture and possible detonation within the gun, under the action of the impact of the propelling charge, and at the same time the resistance must not be such that it interferes with the proper fragmentation when de-

tonation of the fired shell occurs. The range of the physical qualities is limited to almost one precise point that will give the proper fragmentation, and to obtain and maintain this point is essential. Too great a resistance to the bursting effect not only reduces the number of the fragments, but necessarily reduces the destructive capacity of the shell, since too great a proportion of the explosive force is needed to effect the bursting. On the other hand insufficient resistance results in excessive fragmentation in which the pieces are so small that they are not capable of serious damage and lose their velocity quickly, thereby reducing the destructive range of the shell.

A sound casting is absolutely essential, for blow holes, slag spots, spongy areas and shrink holes not only seriously impair the strength of the shell, but tend to interfere with proper marksmanship. The proportions and distribution of the weight of the shell are calculated to a nicety, and the concentricity and position of the center of gravity are the determining factors in governing the flight of the shell. Blow holes or shrink holes may cause enough unequal distribution in the weight of the shell to interfere with its balance in flight and cause it to take a course sufficiently apart from its figured trajectory to strike wide of the mark. Still far more serious is the possibility of a weak spot giving way under the impact in the gun and not only tearing the gun to pieces but endangering the lives of the gun crew. It goes without saying that the casting must be machinable, since a casting too hard to machine could not possibly come within the requirements for fragmentation.

To meet the conditions such requirements call for the average American foundry must make radical changes in its mode of operation. The chemical analysis of the heats must be *exact*, not approximate, as between such and such a percentage of carbon or silicon. Also they must be not only exact but consistent, each day's analysis, melting temperature and speed of operation must be a duplicate of the previous day. The molding conditions must absolutely preclude the possibility of blows, gas or dirty metal. The core making must be practically perfect and the handling of the metal rapid, even and free from delays or interruptions.

Cause of Rejections

Seventy-five per cent of the rejections the foundries of France suffered while endeavoring to produce satisfactory semi-steel shells could be traced directly to the analysis of the mixtures and to this point the American foundry will have to pay the strictest attention. The average foundryman today, while professing to mix his charges by chemical analysis, is forced to admit when questioned closely that he is only approximating the desired result. To be sure he is sufficiently close to meet the requirements a foundry is generally called upon to meet, yet his mode of cupola operation and metal selection would fall far short of producing satisfactory shells. Still further from success, would be the foundryman who mixes his charges by that delightfully uncertain method of accepting the salesman's guaranteed analysis for his iron and coke and "toning" it down with any sort of scrap he may have on hand. Still existing in the midst of the progress foundries have made in controling their analyses, and in a surprisingly large number of cases, we find the foundryman, generally the old timer who "didn't learn his trade from books", who scorns percentages and proportions and mixes his charges by his own rule of reason. His analysis consists of breaking one pig over another and examining the fracture, and his mixing is generally some of the soft and some of the hard and the rest of it scrap. The shell his foundry could produce may look like a shell in size and contour but there the resemblance ceases.

To successfully produce semi-steel shells designed for active service, the services of a chemist are absolutely essential. His control and authority should be absolute, and upon his shoulders should rest the burden of the full responsibility for the mixtures, and under his direction should come every detail that relates in any way to the chemical composition of the semi-steel. Every facility should be afforded him to make and record his various analyses and observations, and his equipment should include the scleroscope and micro-photographic outfit.

Analysis of Materials

Each car of pig iron should be sampled, resampled, carefully analyzed and piled in such a manner as to prevent confusion with any other pile. The piles should be lettered or numbered for future identification. Every car of coke must be of the highest grade both in respect to analysis and body, particular attention being paid to the sulphur, for a poor grade of coke or a coke too high in sulphur is capable of untold damage.

The ordinary method of using scrap must come under a ban if best results are to be obtained. Under no circumstances should the scrap be charged direct into the cupola as a part of mixture. It should be charged alone at the end of the heat and run off into pigs or chills. Each lot of recast pigs or chills must be kept separate and, as in the case of the pig iron, sampled, analyzed, piled and marked for identification. By so handling the scrap all possibility of error due to unknown qualities is eliminated.

The grade and character of the steel are of less importance, since, compared to cast iron, the analysis of ordinary steel is practically stable. A wide range of physical properties may be obtained in steel with practically no change in the chemical properties aside from the condition of the carbon, and as the carbon reverts entirely to combined carbon during the process of melting, the condition of the carbon in the steel has no bearing on the analysis of the semi-steel. In the production of semi-steel any ordinary grade of steel is serviceable, such as boiler scrap, steel stamping or punching scrap, etc., provided it is not so thin and light in section as to be bulky when charged into the cupola, thus interfering with the proper charging. The use of alloy steel is to be avoided as the attainment of the proper chemical and physical requirements for semi-steel shells is too delicate a proposition to risk the evil influence it may or may not have.

The preparing and charging of the cupola should be carried on under the direction of the chemist and with just as much care and attention to detail as the chemist uses in his laboratory determinations. The method of laying, lighting and burning-up the fire should absolutely eliminate the possibility of a poor start, for such a start may spoil a whole heat. The addition of extra fuel after a cupola is well under way, while it may have the desired effect of regaining the proper melting temperature, may also be just enough to upset the analysis sufficiently to result in poor fragmentation. Also a poor start means that quite a proportion of the first metal charged is melted at a temperature below that necessary to produce satisfactory semi-steel. This may result in as much as 20 or 30 per cent of the heat being unfit for use.

All pigs, whether they be from the blast furnace or remelted scrap, should be broken into short, fairly uniform sizes so they may be placed uniformly in the cupola and melt practically simultaneously. Small pigs also facilitate weighing and make it possible to reduce the charging error in weights from pounds to ounces. All components of the charge, whether they be iron, coke, steel or scrap, should be carefully weighed and charged according to formulas and the prescribed quantity of each should be just as close as it is practical to obtain, all guessing and approximating being avoided.

Importance of Cupola Operation

The average method of cupola operation in this country sets at nought any close or accurate work on the part of the chemist. Too often the work of weighing and charging is left to the

care of the laborer on the platform who goes through the operations of weighing and charging with scant regard for anything except speed. Too often the given quantity is measured as so many average pigs, or so many buckets or forks of coke and generally some more for good measure. Such cupola operation may produce excellent sash weights or grate bars and some classes of heavy work, but it would be an absolute impossibility for shell work.

The melting temperature, as determined by the appearance of the metal as it flows from the cupola, should be kept as constant as possible and at a temperature slightly above normal, in order that the timing operations for handling and pouring can be reduced to a science. Semi-steel, like cast iron, will absorb or throw off impurities according to its melting temperature, absorbing impurities, particularly sulphur, when the temperature is too low, and throwing them off when high, so it is essential that the temperature be kept as high as possible, although care must be taken not to burn the metal.

In handling the metal, it was found that the best results could be obtained by using a specially constructed receiving ladle under the spout of the cupola. This ladle, mounted on trunnions, is so constructed or so lined up that the metal flowing over the lip is drawn from the bottom of the ladle, similar to a spout or skimming crucible. This effect can be obtained by taking an ordinary large foundry ladle and placing a fire brick partition running down just behind the lip, parallel to the side of the ladle, to a point several inches from the bottom. The metal to flow over the lip must then first flow down behind the partition, under it and up over the lip. This insures clean metal and gives the air and gas an opportunity to escape off the surface of the metal in the ladle. It performs the functions of a mixing ladle.

Ladle Preheating

The metal should then be transported as rapidly as possible in small ladles with but one change in order to eliminate any unnecessary chilling or oxidizing of the metal.

All ladles and the cupola spout should be thoroughly dried before using and the ladles should be kept over a fire or in a warm place until it is time to use them. The first metal down should be used to preheat both the large and small ladles and then poured into the chills or pigs. Metal which shows any boiling or agitation due to an imperfectly dried lining should never be used even though it eventually comes to rest. Such iron should be poured into the pig bed. When the ladle is once heated up it should be kept going constantly until the end of the heat to prevent its getting cold and chilling the hot metal.

Second in importance to the chemical analysis and the means of obtaining it comes the molding of semi-steel shells. So many rejections and so much trouble could be traced to the use of green sand that its employment has been practically prohibited. The formation of gas and blow holes resulting from the action of the hot metal on the damp sand, and the sand cut from the mold and carried into the shell produced such wholesale rejections that the dry-sand mold became a necessity. One report, in particular, states that one foundry situated in northern France failed to produce a single satisfactory heat until green sand molding was abandoned. The character and grade of the sand and the method of molding varied according to the size of the shell made, and according to the equipment and familiarity of each individual foundry. Two requirements only seemed to be in common. *First*, the sand used and the binder and form of venting were such that the mold was absolutely free venting and porous, and *second*, every mold was provided with some form of trap gate to serve the double purpose of trapping any slag or dirt in the metal and removing air or gas that may be trapped in the metal.

Too much attention can not be paid to the use of the trap gate in molding with semi-steel, especially when the product is shells. A large number of foundrymen look upon it as one of those newfangled ideas to assist incompetent molders. They believe they are fully capable of keeping dirt and slag from entering the mold without such a gate. Such may be the case, but the molder does not exist who can pour a swift rush of semi-steel with the speed necessary to produce perfect shells without trapping air and carrying it into the mold. Ordinarily this air is free to escape through the porous sand, but often the first splash of the metal forms a thin skin or shell which seals the air in and results in the formation of the small holes familiarly known as gas holes.

The position of the casting when poured was a point that gave considerable trouble when the French foundries first started on semi-steel shells. It was at first considered necessary to pour the casting on end, either point or base up, and to allow extra metal on the cope to collect dirt or gas holes and to provide metal for possible shrinkage. This form of molding, while satisfactory in so far as the quality of the shell was concerned, had two disadvantages. It necessitated extra machining to remove the excess metal and it was a difficult molding operation. As the various operations were reduced to a scientific basis, it was noted that the extra metal was no longer a necessity, and a great many foundries discontinued the vertical form of molding. This enabled them to use the match plate form of machine molding and to mold the shells in pairs, using a balanced core.

In order to obtain a record of the grade of the metal during the course of the heat, practically all of the foundries at first adopted the method of casting test pieces at various times during the heat. These test pieces were examined in various ways and the results compared to the mixture, or to the method of operation which had been used at the time the metal represented by the test piece was charged. Some adopted the plan of casting against a chill, breaking the piece and observing the depth of the chill. While satisfactory to a degree, there was one serious objection to this method. The depth of the chill is determined by two factors, the chemical analysis and the temperature of the metal at the time it strikes the chill; it was difficult to determine which might be responsible for an error in the depth of the chill. A ladle of iron or semi-steel of a given chemical analysis may be productive of a series of depths of chills which vary according to the temperature of the metal when poured. The depth of the chill is greatest when the metal is at the highest temperature and if poured at a very low temperature, where the metal is becoming mushy, the chill can be reduced to a mere skin. This fact resulted in the production of test pieces of varying depths of chill which did not vary chemically to a corresponding degree, when the unchilled portion was analyzed. This resulted in confusion and uncertainty as to the accuracy of the tests. Other foundries ground a spot on the test piece and used the scleroscope for the test, while others resorted direct to chemical analysis.

Test Only for Record

Any method of examination, however, proved of little value, except as a matter of record for future reference, for the particular portion of the heat represented by the test piece was already melted, and any change made in the mixture in an effort to correct the analysis did not affect the metal until some eight or 10 charges later when, in all probability, it was not needed. When the form of investigation depended upon the scleroscope or the chemical analysis this discrepancy in time was increased by the time necessary to prepare the piece and make the determination. For this reason any attempt to use the test pieces for the purpose of enabling the foundryman to make a correction during the heat was abandoned, and if the casting of test pieces was continued at all it was only as a matter of record.

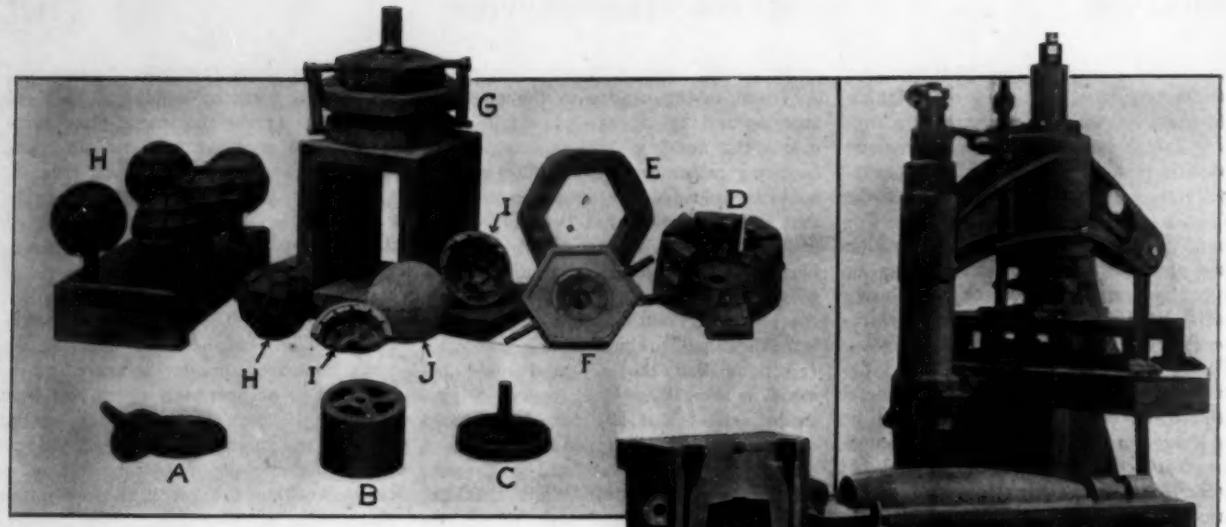


Fig. 1—Cores and Core Boxes for French Grenades

Molding Grenades for the French Army

TO PERSONS who have not had considerable actual experience in a country where every effort is centered upon ultimate victory on the battle front, the important part played by the modern foundry in creating implements of war is only vaguely realized. In France, foundries have been diverted from peaceful pursuits to a basis of war business in a comparatively short time and the efficiency which has been developed is remarkable.

Not only have the French foundries been called upon to furnish a great variety of castings for various machines indirectly utilized for military purposes, but they have been required to enter directly into the munitions field. One of the interesting phases of this new work is the making of grenades. Fig. 1 shows the evolution of a core for spherical grenades used by the French armies. A complete grenade casting is shown at *J* and sectional parts of grenades are shown at *I, I*. The exterior of the casting is a perfect sphere, while the interior is marked by deep staggered grooves. The presence of these grooves involves the use of a spherical core having web-shaped projections on the outer surface. *B* is the core box, in which the lower or small core *A* is made. In building up the entire core, the part *A* is placed in an inverted position in the bottom section of the core box *D*. The band *E* is then placed around the six side sections of the core box and the sand is placed in the box. After it has been rammed, the top section of the box, *F*, is put in place and additional sand is applied through the hole in the top. The springs shown in *G* are then applied to hold the drag and cope tight to the cheek and additional sand is added through the hole in the top. After the sand is rammed, a plug is inserted in the hole and the ring may then be taken from the cheek so that the six sides may be expanded to allow the core to be removed. The finished cores in position for baking are shown at *H, H*.

FIG. 2—HYDRAULIC MOLDING MACHINE FOR HAND GRENADES

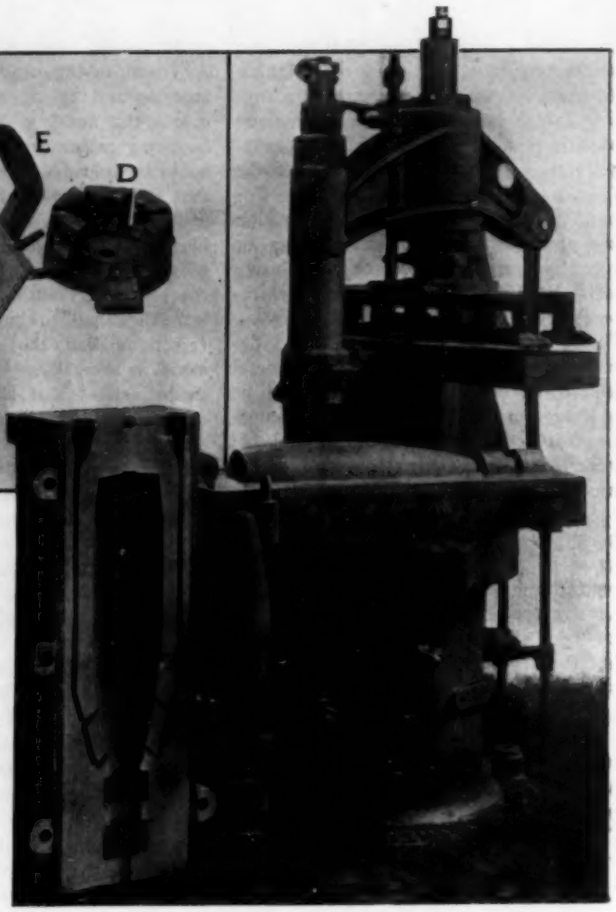


FIG. 3—HYDRAULIC MOLDING MACHINE FOR 155-MILLIMETER SEMI-STEEL SHELLS

Another form of grenade is made on the hydraulic molding machine shown in Fig. 2. Machines of this kind are designed for flat work, two flasks being rammed at the same time. White-metal or cast-iron match plates are used. The flasks are barred and can be poured either in a horizontal or vertical position. Molds can be made on these machines in from one to two minutes, according to the difficulty of the work. The molds shown in Fig. 2 are for small hand grenades used by the French. It will be noticed that the mold has been arranged to be poured in a horizontal position, two pouring gates being provided in the cope. Each mold will make 18 grenade castings. These grenades differ from the one shown at *J* in Fig. 1, in that the exterior surface is webbed and the interior is smooth. This simplified the coring and plain eliptical cores having axial core prints as shown in the foreground of Fig. 2, are used. Figs. 3 and 4 illustrates a type of hydraulic molding machine used extensively in

France for molding semi-steel shells. Fig. 3 shows a mold for a 155-millimeter shell. One casting is made in each flask and the mold is split in half, each part containing half of the pouring gates, runners and core prints. The core shown at the right is supported in the mold by means of core prints as the bottom and chaplets at the sides. After the flask is set in the vertical position for pouring, the chaplets may be drawn out, leaving the core entirely supported by the core prints. The hydraulically operated molding machine shown in Fig. 3 is capable of making from 15 to 20 shell molds per hour.

The mold for two 90-millimeter semi-steel shells is shown in Fig. 4. The method of molding and pouring these molds is similar to that used in the case of the 155-millimeter shells except that a single gate and runner delivers metal to both molds. The output of the smaller shells on a hydraulic machine is from 15 to 20 molds per hour.

The use of hydraulic pressure for molding machines in France was given a marked impetus by the great demand for war materials. It is claimed that the hydraulic machines operate with a steady motion and that high pressure may be secured and controlled with comparative ease. The pressure for the average molding machine varies from 750 to 1,500 pounds per square inch, enabling the designer to keep the diameter of the rams to a reasonable limit and yet attain an adequate total pressure. This has permitted the design of large machines with a static pressure of as high as 80 tons. Small pipe of from ⅛ to ¾-inch inside diameter is of sufficient strength and size for all piping used in connection with these machines.

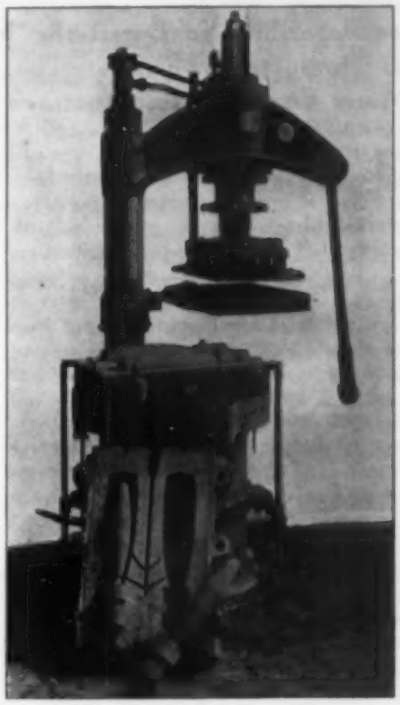


FIG. 4—HYDRAULIC MOLDING MACHINE FOR 90-MILLIMETER SEMI-STEEL SHELLS

Most French companies have found that it is more economical to use strong and uneducated laborers on molding machines than to employ molders who have a better knowledge of foundry practice. Since the war many women have been working on molding machines and they do exceedingly good work, especially on light and medium-sized molds. Piecework is preferred as the basis of payment in many French foundries, but there are a number of employers who favor the premium system of payment. Men who prefer the latter system feel that the piecework price, when once set, is a source of difficulty with the men. With the premium system, they claim, these difficulties may be more easily adjusted. Advocates of the piecework system, however, contend that if an equitable piecework price is determined after sufficient study of all conditions entering into this price, no trouble is experienced and the piecework method of payment tends to increase production.

Why Furnacemen Like Washed Ores

IS THE day approaching when the washed ores of the Mesabi range will be considered more valuable than ores which require no treatment to make them suitable for blast furnace consumption? This thought is engendered by the growing appreciation of the smelting characteristics of these concentrates on the part of blast furnace managers. On account of their desirable features, from a furnace-operating standpoint, western Mesabi washed ores have gradually come to occupy a place of their own in the furnaceman's estimation.

Originally, the washing process was looked upon as an unavoidable difficulty and ores that required such beneficiation were held at a depreciated value, compared with those that could be shipped and utilized in their natural condition. At the same time, the construction and operation of huge washing plants was accepted as evidence of the fact that reserve of high grade normal ores were becoming exhausted. Scarcely anyone, at that time, felt that a washing operation would be undertaken from choice. Instead, it was considered the fruit of evil necessity. As greater skill developed in the operation of the washing plants, however, it eventually became possible to control the metallic and silica contents of the ore definitely within comparatively wide limits. The favorable results of this control, from a furnace standpoint, are almost self evident. These results tend to run parallel to those that might follow from the use of a synthetic ore.

Uniform Conditions Desirable

In the operation of a blast furnace, the maintenance of uniform conditions is of fundamental importance. This phase of the furnace manager's problem was never more clearly explained than in Hermann A. Brassert's classic paper on "American Blast Furnace Practice", read before the Iron and Steel Institute in 1914. In part, Mr. Brassert wrote as follows:

"The success of a blast furnace operation is measured by three results —quality of product, rate of output, and economy of operation. The first step toward their attainment is the realization that they can be accomplished by identically the same practice, the keynote of which is uniformity and heat concentration. If a blast furnaceman strives for a uniform operation, giving the highest production combined with the lowest fuel consumption, he will also obtain the best grade of iron. The incessant struggle for uniformity should embrace not only the raw materials, but their distribution and descent in the furnace, brought about by proper plant design and furnace lines, as well as by intelligent operation. Such efforts will result in maintaining the largest possible proportion of indirect reduction, which allows the maximum amount of carbon charge to be burnt at the tuyeres, and gives the highest hearth temperature, which means the best grade of iron.

"In most countries, the manufacture of iron starts with the best ores, rich in iron, and of a favorable physical structure. Such conditions facilitate good furnace operation and favor low fuel consumption, but they also tend to retard progress. In modern times, and in all civilized countries, the supply of high grade ores has been greatly reduced, compelling the use of materials leaner in metallic content and of adverse physical character, which render good blast furnace practice much more difficult."

Russian Iron and Steel Syndicates

The First of Two Articles Describing in Detail the Methods of Marketing Iron and Steel Products in Russia—The System Has Many Commendable Features

SUBSTANTIAL reports are appearing more and more frequently in regard to the commercial and industrial opportunities in Russia. The southern part of the empire is one of the most fertile agricultural belts of the world. Russia has extensive iron and coal deposits, her oil fields have scarcely been tapped; in fact, the whole nation seems to be waiting for the termination of the war to enter upon a period of progress and expansion. The recent revolution will result in an adjustment of social and economic conditions which will give enormous impetus to this renaissance. It is pertinent, at this time, therefore, to consider some of the fundamental factors which regulate the iron and steel industry in this country-to-be. The following information recently was published in *The Iron and Coal Trades Review*, London, Eng., and is reprinted here for the readers of *The Iron Trade Review:*

In Russia the production of pig iron and steel is principally carried on in three regions: The Ural district, Poland and in the South (Donetz). A fourth producing center, the Baltic, which includes Petrograd and Riga, before the inauguration of trade protection, imported pig iron from abroad, and worked it up with fuel bought from England. The works within this region, as a matter of course, gradually specialized in the production of higher-class iron and steel, notably material for the army and navy, leaving the manufacture of commercial products to the other three centers.

In the Ural district, where the industry was initiated by Peter the Great, large quantities of rich and pure iron ores are found. The principal fuel is charcoal. Its chief output is roofing sheets, a commodity specially Russian. Poland, as regards its coal deposits, may be considered an extension of the Silesian basin, but she produces no coal suitable for cooking, and is obliged to obtain her supplies from Germany. Her iron ores, too, are poor. The Donetz district in southern Russia includes the very rich coal basin of that name, and in it are situated most of the works, which obtain their supplies of iron ores from two principal sources, the Krivoy-Rog and the Kertsh basins. The former lies about 300 miles to the west, and abounds in rich and pure ores which are carried exclusively by rail; the latter basin is close to the Black Sea ports, but her ores are poor and highly phosphoretic. They are worked up principally in three works close to the Sea of Azov, with which they have water communication.

The Extent of the Industry

The total annual output of pig iron in the whole Russian Empire was in 1840 not more than 140,000 tons, but reached 1,000,000 tons in 1890 and 4,600,000 tons in 1915. The total output of all kinds of iron and steel in Russia and the percentages contributed by the various districts in 1915 are shown in Table I.

The present protective tariff *regime* in Russia was inaugurated in 1892 by Count Witte, the then well-known powerful minister, who by means of a warm appeal allured foreign capital into the country and, as a result, the iron and steel industry soon assumed proportions which more than satisfied the ever-increasing demand in the country. An acute crisis ensued, subsequently, for which a solution was only found after some years by the creation of sale combines or syndicates. The first of these was that for the sale of sheets of medium thickness in 1902; it was followed by that for rolled joists and channels in 1903, the wheel and axles combine in 1904, cast iron pipes in 1906, rails in 1907, and finally by the syndicate for the sale of merchant bars, hoops and light rails. These six combines now constitute one syndicate, generally known as the "Prodameta" after its telegraphic address. Its full name translated into English is "Association for the Sale of the Products of the Metallurgical Works of Russia".

By the side of this powerful syndicate for iron and steel there are others, such as the Provoloka for the sale of wire rods, the Gvozd for nails, and the Krovlya syndicate for roofing sheets. Besides these, there is for the sale of coal and coke another combine, the Produgoly, in southern Russia. Notwithstanding all efforts, it has not yet been possible to form a syndicate for pig iron or ingots.

The Prodameta

The Prodameta controls the output of more than 30 concerns, and about 80 to 90 per cent of the total output of products coming within its range. According to the statutes of the Association, its share capital was fixed at 900,000 roubles (about $460,000), divided into 3,600 shares of 250 roubles each. The affairs of the syndicate are managed by a council consisting of not less than 12 nor more than 36 members, elected at a general meeting, and having its headquarters at Petrograd. Not more than one-quarter of the members of the council may be of the Jewish religion. Each member on entering office must deposit in the safes of the syndicate or with the government bank at least 20 shares in the Prodameta, which are retained, and are not returned to the holder before all the accounts and the balance sheet are passed for the period during which the member held office. The council manages all the affairs and moneys of the Association in a manner similar to that adopted in the management of a properly established commercial firm. Broadly speaking, the conditions on which the syndicate effects sales are as follows:

The syndicate is the sole agent for the sale in Russia and abroad of all syndicated goods, that is goods produced by all the works represented in the syndicate, and a special agreement is entered into with each manufacturing concern (referred to in the agreement as "the contractor", which we purpose to use as a short and convenient term in the course of this article). In this agreement the "syndicated goods" are divided into categories and classes, and the syndicate undertakes to sell a certain percentage of each category and each class produced by and allotted to the contractor as his share out of the total sales effected by the syndicate. All quantities allotted to him in excess of his share and deficiencies to complete his share are adjusted every six months, the contractor paying to the syndicate in the former alternative an indemnity of about $12.50 per metric ton of plates or sheets, $9.75 per ton of rolled joists, etc., and in the other alternative receiving from the syndicate an indemnity at the same rates for all deficiencies. In actual practice, however, the syndicate generally adjusts the quantities every quarter, so that half-yearly payments of indemnities seldom become necessary. The syndicate guarantees and collects all moneys due to the contractor, and pays over to him the net amount of his invoices.

Every six months a "general average base price" is fixed for all contractors in the combine, and an "individual base price" for each contractor in a manner to be described hereafter.

To give an idea of the inner working of the syndicate, some of the principal clauses—there are no less than 55 classes in all—of the agreement with a mill turning out joists

and channels, and also some of the special clauses taken from the agreements with a rail mill and a mill producing merchant iron will be given in abstract.

As in the case of similar German combines, the public and the government were antagonistic to the syndicate at first, and people urged the government to pass a law for suppressing trusts and combines of any sort, but gradually public opinion changed over completely in favor of the Prodameta when it was found that the prices of non-syndicated commodities, like iron ore and pig iron, soared high, while those of syndicated products only showed a moderate rise.

Averting a Crisis

Toward the end of 1911, owing to the refusal of several works to renew their agreements, a crisis threatened to put an end to the existence of the combine. At this all the Russian, French and Belgian stock exchanges took alarm, and the values of the shares of the various Russian concerns represented in the syndicate rapidly fell, but several powerful financial houses came to the rescue, the recalcitrant firms were induced to re-enter the combine, and all agreements were renewed for further three years, from Jan. 1, 1912. Some 25 concerns belonged then to the "merchant bar" group of the Prodameta, among which the Donetz-Yurievka Co. was entitled to 10 per cent of the total sales, the Russo-Belge and the Dnieprovienne to 7.89 per cent each, the English New Russia Co. to 6.48 per cent and the Ural-Volga Co. to 6.43 per cent.

To give an idea of the volume of business transacted through the Prodameta, according to statistics published in the daily papers the sales through the combine during the first five months of 1915 and the two previous years aggregated as shown in Table II.

In the second half of 1914 the aggregates of the Prodameta's sales declined more than 50 per cent, especially during the first three months of the war, but they recovered again in November and December, principally in consequence of large government orders for war material, and by the end of May the totals nearly reached, and in one case even exceeded, those for the corresponding period of 1913.

As already stated, there are different forms of agreements. In the case of joists and channels a standard list of the sections is attached to the agreement. The contractor is at liberty to add a supplementary list of sections rolled by his mill, but not included in the standard list, and may add further lists of new qualities, sorts or sections during the period of the agreement. The extra prices to be charged for goods in such supplementary list, any delays in their delivery, and special conditions for their delivery are subject to a special agreement to be drawn up between the syndicate and the contractor. If, on the other hand, the contractor can prove that he has not the required rolls or appliances, or facilities for rolling any of the syndicated goods in the standard list, such goods are struck out from his copy of the list.

While the agreement with the syndicate is in force, the contractor is not allowed, except in special cases, to enter into negotiation of any kind, nor to conclude any contract for the sale of any syndicated goods, including short lengths and goods of second quality, not even if owing to the time which must elapse before the contract or bargain can be completed, the agreement with the syndicate may expire; nor is he allowed to deliver syndicated goods either directly or through intermediaries without the intervention of the syndicate; nor to accept orders for such goods without the syndicate's co-operation or to receive from outsiders raw materials to manufacture syndicated goods. Every contravention of this prohibition renders the contractor liable to a fine of 10,000 roubles (about $5,110), and over and above this fine to a penalty of a rouble per pood (about $31 per ton). The contractor, however, may accept small orders direct for syndicated goods, provided their total weight does not exceed, within any single month, 80 tons, and that the carriage paid for such goods sent by rail does not exceed in any single order 11 kopecks per pood (about $3.42 per ton). In the case of the acceptance of such direct orders, however, the contractor has to comply in every respect with all the directions of the syndicate in relation to them.

Prices Fixed by Syndicate

The sale prices, the base prices, as well as all additions, and all other conditions of the sale, including the terms of payment for syndicated goods, are fixed by the syndicate at the latter's discretion. For all syndicated goods the syndicate arranges with the contractor a discount in accordance with the average base price for delivery at the works fixed for all contractors. All moneys received by the contractor over and above those representing the amounts calculated at base price rates for orders executed, are paid over to him as his own profit.

The individual average base prices applying to a particular contractor are fixed separately for each class of syndicated products, and are computed in the following way. All invoices made out by the contractor during the month under consideration and received from him not later than the fifteenth day of the month following the one during which the goods were delivered are entered to his account. From the aggregate sum are to be deducted (*a*) all extras due to the contractor; (*b*) all sums paid for the carriage of the goods from the railway station, or wharf situated nearest to the works of the contractor to their destination; and (*c*) all rebates agreed to and deducted on the invoices in accordance with the instructions from the syndicate. The difference thus arrived at divided by the total weight of all the goods delivered and entered on the invoices constitutes the individual average base

Statistics on Production of Russian Iron and Steel Mills

Table I

IRON AND STEEL OUTPUT IN RUSSIA IN 1915

	Total output in the empire. Tons.	South. Per cent.	Ural. Per cent.	Poland. Per cent.	Others. Per cent.
Pig iron	4,600,000	67	20	9	4
Steel	4,900,000	56	18	12	14
Finished products	4,040,000	58	17	11	14
Joists and channels	280,000	90	5.3	3.4	1.3
Rails	590,000	78	21.5	0.5	..
Merchant bars	1,400,000	54	10.6	19	16.4
Wire rods	295,000	55	6.4	14.3	24.3
Plates, large flats and thin sheets	535,000	51	6	12	31
Roofing sheets	415,000	21.5	58.5	3	17

Table II

PRODAMETA SALES FOR FIVE MONTHS IN 1915.

	Jan. 1 to May 31. 1915. Tons.	1914. Tons.	1913. Tons.
Bars, joists and steel sleepers	230,352	279,525	244,848
Tyres, axles and rails	245,372	211,073	253,625
Other kinds of rolled products, plates and sheets, etc	462,555	490,532	409,222
Total	938,279	981,130	907,695

price for delivery, f. o. t. at the station, or f. o. b. at the sea or river wharf situated nearest to the contractor's works.

How Base Prices are Determined

In order to arrive at the average base prices applicable generally to all contractors (as from July 1, and from Jan. 1 of every year, for deliveries f. o. t. at the station or f. o. b. at the wharf or pier, in either case at the place of destination), the weights of all the syndicated goods delivered by all the contractors are added together, as well as their invoice values, calculated at the base prices obtained for free delivery at places of destination. From the total sum thus obtained for each class of goods separately, the following deductions are to be made:—

(*a*) All premiums accruing to the contractors as profits, as fixed for this as well as other analogous agreements, with the exception, however, of premiums awarded to divers works for waiving the manufacture of syndicated goods.
(*b*) All rebates and premiums accorded by the syndicate to its customers.
(*c*) All discounts for prompt cash payments and all expenses incurred by the syndicate for the discount of their customers' bills.
(*d*) All expenses incurred by the syndicate in obtaining orders for goods. The total amount thus deducted, however, must not exceed ½ kopeck per pood (about $0.16 per ton) of the total tonnage sold.
(*e*) The stamp duty paid in every case.
(*f*) The amounts of protested bills and all bad debts.
(*g*) All sums paid for the carriage of the syndicate's goods to their places of destination.

The balances thus arrived at, separately for each class of syndicated goods, divided by the total invoice weight of the same class of goods, represents the general average base price for delivery at the works for goods of that particular class applicable to all contractors.

On July 1 and Jan. 1 of each year all accounts between the syndicate and each contractor are adjusted. All balances due to the syndicate are to be paid by the contractor within three weeks after the receipt of the account, and all balances due to the contractor within three weeks after the making up of the accounts. In the case of a delay in the payment on either side, interest at the rate of 1.3 per cent on the unpaid amount is charged for every day.

As regards premiums paid by the syndicate to works for waiving the right of manufacture of syndicated goods, each contractor has to indemnify the syndicate for such payments in proportion to his allotment.

For the purpose of distributing the orders among the works represented in the combine, the goods of each of the two categories are divided into a certain number of classes. The agreement specifies what percentages of the total tonnage ordered in each class of both categories are to be allotted to the contractor. Such total tonnage includes all orders received through the syndicate, and also all direct orders. The syndicate, on the other hand, must pass on all orders due to the contractor in proportion to his share. Should a contractor not proceed within five to eight weeks with an order, the syndicate renews the order after a lapse of three weeks, and a second time in case of further delay, after which the order, if not carried out, is cancelled, but the tonnage of the material in the cancelled order is booked to the defaulting contractor as if the order had been duly carried out. Nothing is stated in the agreement about the payment of penalties incurred in consequence of the delay in carrying out the order.

With the consent of the general meeting, the syndicate has the power to purchase on its own account syndicated goods from works outside the combine for re-selling. The goods thus bought and re-sold do not form part of the total tonnage for which orders are to be placed with the contractor. The syndicate has also the right to come to an arrangement with a contractor whereby a certain tonnage of one class of a category of goods is substituted for an equal tonnage of another class of the same category.

As regards new members, the syndicate may at all times enter into an agreement with one or more concerns wishing to join the combine with the consent of four-fifths of the votes of all the contractors forming the syndicate in proportion of their allotments. On signing such an agreement with a newly-joined firm the syndicate has the right to reduce the allotments of all other contractors. At the date of the joining of a new firm, all orders placed with the old contractors, but not yet executed are pooled with those to be placed with the newly-joined contractor, and dealt with accordingly.

Differences Settled by Conference

The syndicate has to call together a special conference of all the contractors at 10 days' notice whenever decisions have to be arrived at about one or another of the following questions: (*a*) Whether a given product must or must not be considered a syndicated product; (*b*) to give the syndicate power to purchase syndicated goods from non-syndicated works; (*c*) to draw up an obligatory standard list of sections, etc., for all contractors in the combine; (*d*) what documents a contractor has to supply to the syndicate and the latter to the former by certain dates, as specified hereafter. All contractors have to be summoned to such special conferences, and the number of votes held by each representative is in proportion to the tonnage allotted to his works in the general distribution of orders for syndicated goods. Besides the contractors, an authorized special representative of the syndicate has also to be present, and has 10 votes. Four-fifths of the total tonnage must be present at the meeting besides the special representative of the syndicate, and at least two-thirds of the votes present must be in favor of a resolution, to pass it. The syndicate and the contractor have to submit to all such resolutions provided they are not in contradiction of the agreement with the syndicate. In case of non-compliance the contractor has to pay a fine of 25,000 roubles (about $13,000) for every breach in addition to all fines incurred by him under any clause in his agreement.

The Purchase of Goods

Every contractor, if obliged to purchase syndicated goods, must obtain these exclusively from the syndicate. The latter undertakes to deliver them (*a*) for his own private use at the price delivered free at destination, fixed by the syndicate for the largest commercial firms in his neighborhood; (*b*) for his works for manufacturing goods for sale, at the corresponding price fixed by the syndicate for the largest works in the same neighborhood.

The contractor must not resell or cede to anybody syndicated goods thus acquired without putting some work on them—that is, no joists or channels as received—but only as part of some work manufactured by him.

If the syndicate should refuse in writing to sell to him syndicated goods, the contractor may buy such goods from works outside the syndicate, but only in his own name, on his own account, and at his own risk. He must, however, give early notice to the syndicate of every such transaction.

The contractor, after signing his agreement, must within 30 days send in a list of all orders for syndicated goods booked by him before the signing of the agreement, but not yet carried out. All these orders must be carried out on his own account and at his own risk, but the tonnages represented by them are deducted from his allotment. Should the total tonnage of any particular class of goods in such orders exceed the tonnage allotted to him, the syndicate

has the power to distribute the excess quantity among other contractors in the combine, and the contractor, on the demand of the syndicate, has to cede to the latter such excess and pay the difference (if any) in the price at which he took the order and the price fixed by the syndicate for the half-year under consideration.

Handling the Orders

The syndicate transmits orders to the contractor in proportion to his allotment in each class, and each category with a plus or minus tolerance of 10 per cent in any class in the first half-year. In the case of a deficiency sufficient orders are to be sent to him to wipe out the deficiency in the second half-year. Excess quantities in one class of the same category are considered to counterbalance efficiencies in another class. At the end of each contract year, ending Dec. 31, the syndicate prepares returns of all excess and deficiencies in each category of goods, and should it be found that the contractor has not received his full share of orders for goods in any particular category, the syndicate pays him an indemnity of 30 kopecks for every pood of the deficiency (about $5.60 per ton), and the tonnage for which he receives indemnity is booked against him as part of his share. Inversely, if the contractor has in the course of a year accepted more orders than his due share, he has to pay the syndicate an indemnity at the same rate for the excess tonnage. After all these adjustments and payments have been made, the syndicate will be considered to have fulfilled its obligations towards the contractor for that year. All payments for excess or deficiencies have to be made within a month after the account has been rendered.

Lengths not exceeding 2 feet will be considered crop ends. The contractor is allowed to sell these direct on his own account at a price fixed by himself, but only to iron and steel works, and solely for the purpose of being smelted down at the purchaser's own works.

Second-quality and rejected syndicated goods are sold by the syndicate or with the syndicate's sanction by the contractor himself at the prices fixed by the syndicate for the period of the sale, but will be counted as part of his share for first-quality goods. If during any half-year the contractor succeeds in obtaining over and above the general price fixed by the syndicate for second-class or rejected goods a price higher than the general average base price for the same category of goods, such excess price is to be paid during the next half year by the contractor to all the other contractors for goods of the corresponding categories.

If the contractor should inform the syndicate by telegram or registered letter that owing to the stoppage of work he is unable to carry out the orders transmitted to him by the syndicate, it will be assumed by the latter that the contractor is equally unable to carry out orders previously received, but not yet executed until the notice of the stoppage of work is cancelled in the same way. At the same time he must inform the syndicate as to which orders among those received he is able to carry out within the specified time, and which he cannot, or refuses to, carry out. The total tonnage of the orders which become due to the contractor during the period of the stoppage at his works are booked to him even if no orders are actually transmitted to him during such period.

The contractor is responsible within the limits of the law of the State to the syndicate for the quality and the correct weight of all goods delivered by him under orders transmitted to him by the syndicate as well as for the deliveries within the time stipulated in the order.

The syndicate, when acting on behalf of the contractor, must transmit all orders to him at the prices fixed with each client, and must indicate in each order the person, firm or establishment for whom the order is to be carried out. The syndicate must also set out on all invoices to clients the name of the contractor.

In order to cede to the syndicate the exclusive right, and enable it to collect moneys from clients for orders executed, the contractor waives his own right in this respect, and will allow the syndicate to confirm all orders direct in writing to client and purchasers on his behalf. With the same object in view, the contractor must send all papers and documents required by banks for the payment of orders, including all letters accompanying them, on forms or letter paper, headed with the syndicate's name, etc., in the form, and numbered, as directed by the syndicate.

The contractor must acknowledge without delay receipt of all orders, or give notice of his refusal or inability to carry them out, by registered letter. Should the syndicate receive no acknowledgment within a fortnight, it will be assumed that the order has been refused.

Notices of the dispatch of goods are to be sent direct to the customer by the contractor, together with duplicates of the waybills, bills of lading and receipts for the due delivery of the goods, setting out at the same time the sums to be paid on delivery. Copies of all these papers and enclosures must be sent to the syndicate.

(To be concluded next week)

Graphite Production is Increased

The production of flake graphite has increased steadily during the last three years, owing to its large demand for use in making crucibles. H. G. Ferguson, of the United States geographical survey, department of the interior, estimates that the production of flake graphite for 1916 was about 11,500,000 pounds, as compared with 7,074,370 pounds in 1915 and 5,220,539 pounds in 1914. Alabama furnished about 5,500,000 pounds, and the remainder came from the mines in California, Montana, New York and Pennsylvania. In all, 16 companies produced flake graphite. The imports of flake graphite, chiefly from Ceylon and Madagascar, far exceeded the domestic production. Owing chiefly to the immense demand for crucibles for use in making munitions, the better grades of flake graphite now command more than double the price at which they sold before the war.

Most of the amorphous graphite used in this country is imported from Mexico and Chosen (Korea), but a total of 2,562 tons was obtained from mines in Michigan, Nevada, North Carolina and Rhode Island. Amorphous graphite is not suitable for use in the manufacture of crucibles but can be used for making lubricants, pencils, paints and foundry facings.

According to a recent issue of a Buenos Aires paper, new steel works have now been established at Santiago, Chile, to utilize the scrap iron previously exported to Europe. This new enterprise owes its existence to the high price of steel. Much difficulty was experienced at first in obtaining skilled workmen, but the situation was eventually met by employing Spaniards from Bilboa. Chilean coal is used as fuel. The products of the new steel plant include merchant bars, sheets, angles, bars for reinforcing concrete, nails, horseshoes, etc. The price of the steel is said to be 20 per cent less than that imported.

McLain's System, Milwaukee, announces that it has sold a 3-ton open hearth steel furnace to the George H. Smith Steel Casting Co., Milwaukee. The work of constructing the furnace has already commenced and it is expected it will be in shape to melt steel April 15.

Work Progresses on Cromwell Plant

First Unit of New Steel Works on Bank of Black River at Lorain, O., Nears Completion—Plans Call For Use of Steam Hammers Instead of Blooming Mill Equipment

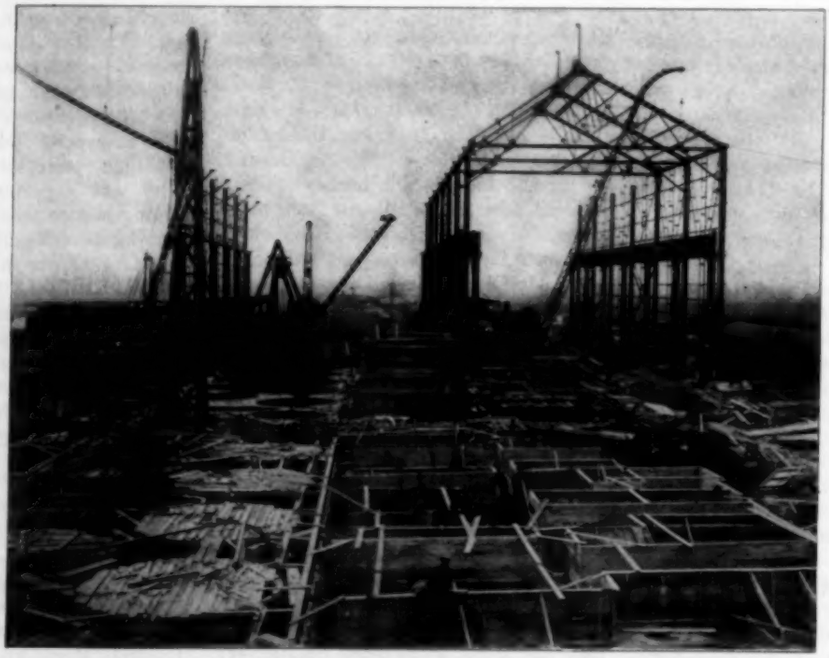
STRENUOUS construction work, reminding one of the activity witnessed in northern Indiana when the sand dunes were swiftly made the site of extensive steel mills, is being carried forward with similar rapidity on the banks of the Black river at Lorain, O., where the first portion of the Cromwell Steel Co.'s new plant is nearing completion. The Cromwell company was organized somewhat less than a year ago by J. C. Cromwell and his associates with $2,000,000 capital stock. The ultimate plans of the company call for a complete plant, from blast furnaces to finishing mills. The company has a 233-acre site on the eastern banks of the river opposite the plant of the National Tube Co. The river frontage is 2,500 feet. The company expects, at some time in the future, to erect blast furnaces which will be supplied with ore from boats unloading at a dock adjacent to the furnaces. At the present time, however, only a number of open-hearth furnaces and a rolling mill with the necessary auxiliary buildings are being erected.

Although the rapid construction of new industrial buildings and plant extensions is the rule rather than the exception in these days of extreme activity in the iron and steel industry, it is seldom that tardy deliveries of equipment and delays due to traffic tangles do not hamper the actual construction. Such, however, does not seem to be the case when one views the progress at the new Cromwell plant. Construction on the open hearth furnaces started last fall. At the present time the foundations for the original unit of four open hearth furnaces are completed. Slag used in the concrete work is obtained from the National Tube Co.'s Lorain plant. The structural iron work on the open hearth building is practically finished on a section covering two of the furnaces. The men who are to place the sheeting on this building are already on the grounds painting the sheets, which will be placed as soon as the few remaining roof trusses on the part of the framework covering the charging side are in position. The four ladle stands and slag pots are completed. The progress is clearly indicated in the accompanying illustration.

The bricks for the construction of the furnaces have been delivered, including the refractory bricks for the linings. The excavation for the soaking pits is finished and waiting for the concrete to be placed. Progress here has been delayed by washouts resulting from the spring storms. Actual work on the mill building has not been started as yet, but the ground is staked out and the structural steel is on hand so that once construction is started, it will proceed with little delay. Several carloads of steel rails are piled on this site ready to be laid at the earliest opportunity. It is apparent from this stage of development of the new plant that it is entirely feasible that steel may be rolled by the first of July.

In several regards, the plant is unique in its engineering features. The company plans to produce only high-grade steels suitable for the automobile manufacturers and for tool steel. The open-hearth building, now being erected, is 342 feet long and 133 feet wide and will house four 60-ton furnaces. Provisions have been made for the addition of 10 more furnaces by extending one end of the building. Each furnace will have a steel stack, 175 feet high. Oil fuel will be used entirely. Iron ore, scrap, limestone, etc., will be carried from the storage yard at the side of the furnace building to the charging floor by a trolley system of conveyors, which will be power-operated to the charging floor, returning to the yard by gravity. An overhead crane with a span of approximately 70 feet will serve this portion of the building. The ladles of molten metal will be handled by a 100-ton crane having a span of about 60 feet. A separate ladle stand and slag pot have been provided for each furnace. It is intersting to note that five or six carloads of chrome ore have already been delivered to the plant.

The metal will be poured from the ladles into the ingot molds which will be carried on cars at the side of a pouring platform. The ingots will be moved from the open-hearth building to the 12 soaking pits placed conveniently at the end of the mill building. From the soaking pits, the ingots will pass to the mill building, where, instead of passing through a blooming mill, they will be cut and pounded to size by a number of 20-ton steam hammers. This feature is somewhat unusual in steel mill practice and doubtless it will be interesting to note the success of this innovation under operating conditions. The boiler house will be located between the mill and the open hearth buildings, close to the steam hammers. The mill



VIEW OF OPEN HEARTH BUILDING, MARCH 31

rolls will be operated by a steam engine, which will be located outside of the mill building. All other equipment, transfer tables, etc., will be actuated by electricity. The mill building will be 55 feet wide and 700 feet long. The hot beds, which are to be 80 feet wide and 175 feet long, will be placed at the end of the mill and will extend to a shipping and storage yard. The crane runway in this yard will be 80 feet wide and 120 feet long.

Part of the earth that has been excavated from various parts of the plant has been used to build a reservoir 300 feet in diameter and 8 or 9 feet high. This will be used for emergencies should the regular supply of water be shut off for any reason.

The site of the present development is approximately 1,600 feet from the river and is about 45 feet above the water level. The land between this point and the river drops off abruptly to nearly water level about 800 feet from the river. It is on this low level land that the blast furnaces will be erected. The ore from the boats will be unloaded directly to stock piles at the side of the furnaces, and when these are added the Cromwell plant will be an entirely self-contained unit.

Belt-Conveyor Coal-Loading Plant

IN a paper read before the Northern Engineering Society of New South Wales, E. M. de Burgh describes the erection of a large belt-conveyor coal-liading plant at Port Kembla, New South Wales, under the direction of the department of public works. The total length of the conveyor is 1,400 feet. This great length precluded the use of a single belt so that two belts are used. The short belt is 698 feet in length, and the seaward belt 722 feet between centers of tension pulleys. The first belt discharges onto the second over a gridiron chute, and each belt is operated at the forward or seaward end, the coal traveling toward the operating pulley. Although timber screens are provided on each side of the belt to protect the coal, they are not close enough to the belt to act as guides to keep the coal in place, nor are any such guides necessary, the troughing of the belt sufficing for that purpose.

The belts are 36 inches in width, with four-ply duck canvas in the center and seven-ply at the edges. The thickness of the rubber coating is 1/16-inch on the back and 3/16-inch in the center of the working face, the thickness of the rubber diminishing toward the edges of the belt as the number of the plies of duck increases. The canvas duck used in the manufacture of the belt was specified to withstand a tensile stress of 400 pounds on the lineal inch after vulcanizing. Each of the four rubber belts at present in use was manufactured in a continuous length, a course which was thought advisable at the time owing to the great difficulty of providing a satisfactory joint in the rubber belting. Mr. de Burgh, who designed the works, is, however, satisfied that this construction is not to be recommended. The task of getting the long belts into place, which necessitated the unshipping of the idlers and pulleys, was a very serious one and the danger of a complete and prolonged interruption of the working of the plant following an accident to a portion of the belt is so great as to make it most desirable that jointed belts should be used. However, one of the loading-arm belts needing repairs has been cut out and a new belt jointed with so-called alligator steel clips has been introduced. If it proves satisfactory the like can be used in the main belts, if required.

These rubber belts have been in operation since April, 1915, and had, up till the beginning of September, 1916, loaded 231,514 tons of coal and 47,635 tons of coke, and their condition was then excellent. Not only were immense lumps of coal delivered from the collieries, but pieces of broken machinery and even sleepers with dog spikes protruding from them came through the chutes. No serious damage, however, resulted from these causes, and, while small abrasions of the surface of the belt occurred, it has not yet been necessary to cut out a length of the main belt. To make surface repairs cheaply and rapidly, a small portable vulcanizing plant has been provided.

The conveyor belts are operated at a speed of 360 feet per minute. This speed may be increased to 500 feet per minute by a simple alteration of the gearing, but it has been found that the speed of the plant was sufficient, particularly as the speed of coaling is controlled by the trimming time of the vessels. In the case of one vessel, S. S. WINFIELD, 5,420 tons were loaded in a total working time of 27 hours, 40 minutes, giving a loading speed of 196 tons per hour. The actual working time of the conveyor was, however, 11 hours 32 minutes, or 58 per cent of the total time, and the quantity of coal loaded per hour of running time was 467 tons. While loading this vessel, 178 cars containing approximately 10 tons each were discharged, sent on to the empty roads, and the contents loaded in 182 minutes running time. Further, during an uninterrupted run of one hour with a single chute discharging into one hatch, 500 tons were loaded, and in a similar run of one hour with two chutes working into two hatches, 647 tons were loaded, which is a very high rate for loading.

The whole plant is electrically operated. The total cost of the Port Kembla jetty coal-loading machinery and power house, including the concrete foundations of the latter, also of flight-conveyor pit and in the belt subways, but excluding all railway lines in approach, is roughly estimated at $400,000.

Bids for Plant

The city of Lynchburg, Va., has issued a bulletin describing its resources as a site for a government armor plant. Lynchburg is 204 miles from the seaboard and lies among the Appalachian mountains. It is situated on the Norfolk & Western and the Chesapeake & Ohio railroads. Special low phosphorus pig iron can be secured from the Cranberry Furnace Co., located at Johnson City, Tenn., a distance of 229 miles. Ferro-chrome can be obtained in Holcomb Rock, Va., located 10 miles from Lynchburg. It is claimed that large quantities of steel scrap and manganese can be secured in the immediate vicinity of Lynchburg and also that nickel, which has heretofore always been obtained from Canada, could be obtained from a large undeveloped nickel ore deposit located at Floyd Area, Va., 70 miles from Lynchburg.

The Julius King Optical Co., New York, has been awarded the Louis Livingston Seaman medal for the year 1916 by the American Museum of Safety. This medal was awarded for "progress and achievement in the promotion of hygiene and the mitigation of occupational disease". This award was based on the Julius King Optical Co.'s efforts in the production of a scientifically correct color scheme for lenses in goggles worn by workmen exposed to the intense glare of arc welding and other metallurgical operations.

The Problem of the Negro Laborer

The Decrease in Immigration and Industrial Expansion Has Led to the Northern Migration of Many Southern Negroes—How Negro Workmen Are Handled in the South

SINCE the beginning of the European war, the great industrial section of the United States north of the Ohio river has suffered from a pronounced shortage of common labor and lasting relief only can be effected by a resumption of immigration. Whether this will follow the termination of the war or whether the foreign element which now so largely constitutes our common labor will return to their battle-scarred countries is a question that cannot now be answered definitely.

During the period of depression which prevailed for several years prior to the outbreak of the war, the emigration of laborers from this country was unprecedented in our industrial history. Since August, 1914, thousands of reservists have returned to the homes of their nativity, with the result that the ranks of common labor have been greatly depleted.

While negro labor was employed to a limited extent at blast furnaces and in steel works, foundries, etc., in the north, prior to the war, foreign white labor was given the preference due to its energy, reliability and thrift. Most of the negroes employed at these plants prior to the summer of 1914, had been north of the Ohio river for many years, the majority of them being descendants of the northward migration during and immediately following the civil war. When it became apparent to manufacturers that the bidding contest into which they had entered for the services of the remaining white common labor only would have a tendency to further advance wages, they began to turn toward the negro labor of the south for relief.

The Northward March

The wages offered by the labor agents and the pictures painted by them of conditions prevailing in the north proved alluring to thousands of negroes in the south. Trainload after trainload migrated to the industrial sections north of the Ohio river, where they are today trying to adapt themselves to their new conditions and surroundings. Most of the negroes were obtained in the agricultural districts of the south, notably from Mississippi and southern Alabama, where the boll-weevil ruined the cotton crop last year and torrential rains washed out the corn. Their poverty-stricken condition made them alluring prey for the labor agent, although many floaters from the industrial sections of the south, notably Nashville, Memphis, Chattanooga and Birmingham also joined in the northward march.

On the average, the experience with this negro labor in the north has not been satisfactory, nor has the experiment proved eminently successful. This is attributed largely to a lack of understanding of the negro character and to unsatisfactory housing conditions. The negro's sudden elevation to what he considers wealth, as represented by the content of his pay envelope at the end of a week or two-week period of employment, was also a potent factor in his lack of success.

His Best Chance

At southern industrial plants, the opportunities for the negro to advance are great. Common labor receives from 19 to 21 cents an hour and every incentive is offered the ambitious colored man to become skilled in some trade. The color line in the crafts is not drawn nearly as closely in the south as in the north, although the whites and blacks work in separate gangs almost entirely. It is not unusual to find negro molders earning from $4 to $6 per day, and at coal and ore mines, blast furnaces, steel works and rolling mills, many positions of responsibility are held by negroes.

Accustomed to the commissary in the agricultural section of the south, and to the company store in some of the industrial communities, the transplanted colored common negro laborer is at a loss to know what to do with his wages in the form of actual cash, and in many instances a vacation is immediately declared until this money is disposed of, when employment is again sought to tide over another period of excesses and possible debauchery.

Some of the iniquities of the southern commissary system have included a 20 per cent discount from the future earnings of the negro when making purchases, and as a result, he rarely receives any considerable amount of cash on his wages. Where the company stores prevail, in some instances a slight discount is charged against the future wages for the accommodation afforded, although the largest iron and steel manufacturers in the south operate the company store merely for the convenience of their employes and only at isolated plants where the shopping facilities of larger communities are not available. These emporiums are models of the department store type, and the prices at which foodstuffs and other commodities are sold, are considerably lower than those prevailing in large centers. Here the employes are permitted to trade on their future pay without discount.

They Must See the Country

Aside from his inability to adapt himself, without a long period of training, to the tasks imposed upon him in the industrial establishments of the north, the negro from the agricultural districts of the south, likes nothing more than a "ride in the cars" and this accounts for his brief sojourns in any one place, since he is prompted to "hit the rattlers" by his desire to see all there is to see in the north. The negroes from the industrial sections of the south are somewhat more sophisticated, and if not of the floater type, are liable to develop into high grade common labor.

Unsatisfactory housing conditions have proved to be another stumbling block to the retention of negro labor in the north. Accustomed to paying $2 per month per room for a three or four-room bungalow or shack, the transplanted negro is non-plussed when asked to pay from $15 to $25 per month for a small apartment or house, and as a rule, he is considered an undesirable tenant on account of his color.

The severity of the northern winters also has reduced the ranks of this negro labor, although with the advent of spring this army will not shrink from this cause. The most satisfactory experiences with this negro labor in the north are reported by plants where large stockades have been built to house and feed them and where they are permitted to obtain advances on their wages as they accrue from day to day.

In some of the southern states, the operations of the labor agent are classed as misdemeanors and are punishable by fines, yet notwithstanding

this precaution to retain this labor south of the Ohio river, migration northward continues. It is reported that many wild stories are being circulated to scare the negro into leaving his home, and one of the most fantastic is to the effect that there will be a German invasion of the south and that the colored race of this section of the country will be the subject of attack in retaliation for the use of colored troops by the allies against the Germans. It is further added that the only section of the country that will be protected from invasion is that inhabited by "the rich white folks", north of the Ohio river.

Although the industrial south has suffered to some extent from the withdrawal of its negro labor to the north, nevertheless the majority of the desirable colored workmen have elected to remain at home. The president of one of the largest manufacturing plants south of the Ohio river said that the desertions from his ranks have been large, but are represented mostly by men of the "floater" type, who sooner or later would have moved on or who would have been discharged for inefficiency.

While the cost of living in the south is much greater than it was before the war, nevertheless it does not begin to approach the high level prevailing in the north. Comfortable houses, containing from three to four rooms can be rented at from $6 to $8 per month, and with a growing season of 300 days, the negro with a plot of ground around his home can provide himself with his entire supply of vegetables. Since there is practically no community life in many of the villages, this is introduced by the companies undertaking industrial operations in outlying districts. In some cases this includes providing separate schools for the blacks and the whites, dental and medical service, company stores, clubs, guild halls, etc.

Also it is becoming increasingly difficult for the undesirable negro to obtain employment at these plants. The bureaus that pass upon the qualifications of the applicant for work consider his physical fitness more rigidly than is done in the north. His character is investigated and the so-called "bad man" is weeded out. Prohibition has greatly reduced crime among the negroes and with the enforcement of "bone-dry" laws in some of the states at an early date, a further improvement in the moral conduct of the negro of the south is anticipated.

A. J. Corcoran, Inc., manufacturer of windmills, pumps, tanks and towers, will move its offices May 1 from 11 John street, New York, to the factory, 761 Jersey avenue, Jersey City. The new offices provide improved facilities for handling the business of the company and for displaying its goods.

Making Steel

In New Furnaces of Algoma Plant—Nickel Tax Fixed

Toronto, Can., April 9.—A statement by the Lake Superior Corporation of Sault Ste. Marie shows that for the eight months ending Feb. 28, the Algoma Steel plant produced 167,000 tons of finished material. Production did not come up to expectations on account of delay in obtaining materials, caused by railway troubles. The output of the plant is sold up for the current year and unfilled orders represent approximately 411,000 tons. A certain proportion of rails is included, but a substantial part of the tonnage is for munition purposes. It was expected the two new 75-ton open hearth furnaces would be in readiness about the beginning of the year, but these have been delayed. The first of the new furnaces now is producing steel and the second may start in about three weeks. A third is in course of erection and should be finished sometime in May. With the completion of these furnaces the Algoma Steel Corporation will have steel-making capacity for all plants, of about 50,000 tons of ingots per month.

The mining tax bill, which imposes a greatly increased tax on nickel and nickel-copper mines, was passed by the Ontario legislature April 5, after having been re-drafted and considerably modified. As finally adopted all mines other than nickel and nickel-copper are subject to a tax of 3 per cent on profits in excess of $10,000, and under $1,000,000, and an additional rate of 1 per cent for each $5,000,000 profit in excess of $1,000,000. Nickel and nickel-copper companies are taxed at the rate of 5 per cent on profits from $10,000 to $5,000,000, with an increased rate of 1 per cent on each $5,000,000 profit above the $5,000,000.

The tax is made retroactive from Jan. 1, 1915. The acreage tax on all mining lands was fixed at 5 cents per acre.

Consider Steel Plant

A steel plant is among the possibilities of the industrial development of Tacoma, Wash., according to remarks of the business men who attended a recent dinner in that city in honor of William H. Todd, of New York, president of the Todd Shipyards Corporation. Those in attendance were stockholders of the corporation. Mr. Todd stated that while in New York, he was offered contracts for the building of 10 additional steamships at the Tacoma yard, and that the acceptance of additional work would depend upon the rapidity with which the plant would be completed. It is announced that the contract for the building of the plant has been awarded to the Hurley-Mason Co., of Tacoma.

Acquire Old Stack

New York, April 10.—Title to the old furnace at Talladega, Ala., of the Northern Alabama Coal, Iron & Railway Co., has been passed to E. J. Bird and B. R. Kenworthy, care of H. Evan Taylor, Morris building, Philadelphia. The stack is being rehabilitated for blowing in about June 1. It will be operated as the Bird Iron & Coal Co., and will have an output of 5,000 to 6,000 tons of foundry and forge iron per month. The stack at Talladega was built in 1889 and remodeled in 1900-1901, has dimensions of 72 x 18 feet and is equipped with three Whitwell stoves, 62 x 26 feet.

West End to Run

New York, April 10.—The Roanoke Iron & Steel Corporation is the name of a company just organized to purchase the West End furnace at Roanoke, Va. The stack, which last was active in 1907, is to be rehabilitated and placed in operation. The West End furnace was built in 1890. It is an 82 x 16-foot stack with a monthly capacity of about 4,000 tons.

Orders Army Belts

The Mills Woven Cartridge Belt Co., Worcester, Mass., has received large orders for United States army belts, which will keep the plant rushed at full capacity for a year and necessitate additional equipment and plant enlargements. A storage warehouse for raw materials is under construction. The company has increased the wages of its 400 employes 10 per cent, effective at once.

Will Start Stack

Chicago, April 10.—Inland Steel Co. will blow in its new blast furnace stack about April 15, after having been delayed for some time by lack of coal for its coke ovens. The latter supply is not fully assured, but with lake navigation ready to open, it is believed sufficient coal will be available to meet requirements. This will give Inland three active stacks.

Government Building War Machine

Billion Dollars of Ordnance Orders Are Placed With More to Follow—Military Authorities Exercise Legal Power in Fixing Prices—Huge Appropriations and Taxation Plans Being Molded

Washington, April 10.—With the United States forced into the European war, the iron and steel industry of the nation is facing great responsibilities. Present activities, though extensive, may prove to be meager in comparison with what finally may be entailed. The industry is being relied upon by the government as one of the principal bulwarks of defense against a formidable foe. It is to be pressed not only to supply weapons for forces of the United States on land and sea, but President Wilson has determined that nothing shall be done to disturb the furnishing of war material to the country's European allies. No matter what sacrifice may be necessary, it is clear the government is prepared to bring the conflict to a successful conclusion. Should the occasion demand, this country will build up a war machine so tremendous as fairly to dwarf even that of Germany. It is recognized that the United States has the potential strength for such an achievement. With an annual capacity of 45,000,000 tons of steel, capable of great expansion, the industry of the United States represents a gigantic source of military power.

While the government has been extremely slow in starting preparations for war, both industrially and in man power, it has taken long strides in mobilizing its physical resources. The steel industry was one of the first to be mobilized. Through the efforts of the naval consulting board and the council of national defense, the military authorities know exactly what may be expected from the steel industry. This does not mean that little remains to be done to prepare the industry to supply certain classes of fighting material, such as rifles, ammunition and field artillery in accordance with the government's own specifications. Because of the nature of the war, however, it will not be necessary that full requirements in that direction be furnished at once. Munition plants supplying material for European countries will be and are being called into service to supply without delay the government's immediate requirements. As soon as possible they will be put in a position to meet the government's requirements without disturbing the flow of supplies to the entente allies. Steel plants which have not been engaged in making war supplies also will be provided as soon as possible with the necessary jigs, gages and other special tools for producing war material in accordance with United States government specifications. It is the purpose of the government not to interrupt, if it can be avoided, regular commercial business in iron and steel. The plan is to distribute orders according to the capacity of the various plants and to let the load bear evenly.

Want Prices Fixed in Advance

Already, differences as to what are fair prices have arisen between the navy department and manufacturers. Recently Secretary Daniels compelled the E. W. Bliss Company, Brooklyn to reduce considerably its original bids on torpedoes. On Mark VIII torpedoes, $9,164 each was bid. The department decided that this price should be reduced to $7,992 each, and that Mark X torpedoes should be reduced from $7,816 to $6,140 each. These prices, named by the department under provision in the national defense act, it was held, would afford reasonable profits. The Bliss company accepted the prices offered. If it had been refused, Secretary Daniels said, its plant would have been commandeered by the government. The event has caused a fear that the department by such arbitrary power may determine on prices which not only will represent no profit to the manufacturers, but will go below cost. For this reason, many manufacturers are supporting the plan of fixing prices in advance.

Tremendous Orders Placed

Tremendous orders now are being placed by the military authorities with steel and munition plants for structural steel ammunition, ordnance and other supplies. For obvious reasons details regarding these orders are not being given out. What is being done in this direction is illustrated by a report that the war department alone has recently placed orders for more than $1,000,000,000 worth of ordance, and is about to greatly increase this amount. The plan under which these orders were placed demonstrates the loyalty of the manufacturers taking these contracts. As is known, the war department was embarrassed by the lack of funds because its appropriation bill did not pass at the previous session of congress. It asked the manufacturers to accept orders on a "promise to pay" basis. Without exception the manufacturers responded in the affirmative. The army appropriation bill which failed of passage carried $240,000,000. With three other appropriation measures which failed to pass, it was rushed through the house without change last week two days after the present extra session of congress convened. The senate committee on military, has added $38,274,000 to the army bill. Included in the list of appropriations that did not pass previously were the sundry civil bill carrying $136,000,000 and the general deficiency bill providing $62,583,000. The senate passed the latter measure with $100,000,000 added to it and is ready to act on the others. These measures, however, are only comparatively small factors in the way of appropriations when it is considered that the administration has asked for immediate appropriations totaling $3,502,517,000 for war purposes for one year. This tremendous sum, no doubt, will be greatly increased from time to time. Of the total named, $2,952,537,933 has been asked by the war department in connection with its plan to raise an army of 1,000,000 men in one year and of 2,000,000 in two years. The administration's military bill proposes to raise 500,000 men the first year by selective draft. The $2,952,537,933 budget represents only the cost of building the war machine. Its maintenance in actual war would double the expense, and as mobilization of the necessary reserve supplies must parallel the development of the army, $6,000,000,000 probably represents the total cost for one year for the first 1,000,000 men. Of the $2,952,537,933 asked, approximately one-half is to go for pay and quartermaster's supplies, including the cost of cantonments to house the troops at training centers. Another $600,000,000 is for ordnance direct, and $550,000,000 for reserve ordnance; about $60,-

000,000 for signal corps and aviation equipment; about $146,000,000 to the engineer equipment and field works. The ordnance estimates, among other things, include additional provision for coast defense. Estimates of the navy department total only $468,394,552. Of this sum, $175,855,762 is to increase the authorized strength of the navy to 150,000 and the marine corps to 30,000. For other necessary expenditures for the naval establishment, at the direction and discretion of the President, $292,538,790 is asked.

Lower Prices Granted

Supplies of all kinds for the war and navy departments are being furnished and will be furnished at prices materially lower than those prevailing in the open market. Big concessions have been made by the steel and by the copper producers. The brass, aluminum, lead and zinc industries are said to be ready to offer to sell government supplies on a reduced basis.

Aside from deciding upon an issue of bonds to raise part of the special appropriations of $3,500,000,000 already issued, the administration has not determined upon a definite program. At this time it seems to be the opinion that most of the taxation will call for a higher rate on incomes, as well as the lowering of exemptions; higher taxes on estates, whiskey, beer and tobacco, together with new methods not yet defined. Considerable has been said about increasing the excess profits tax, but inasmuch as the government will unquestionably take a firm hand in the matter of fixing prices for supplies for itself and for many supplies for the public generally, it seems unlikely there can be any great amount of "excess profits". Talk also is heard of increasing the taxes of munition makers. By doing so, it has been pointed out, the government in effect will be taxing itself and the entente allies. Senator Simmons, chairman of the committee on finance, told *The Iron Trade Review* it is self-evident such would be the effect. Moreover, he added that munitions makers already are bearing a good sized tax. A tax on general iron and steel products would mean the large portion of its payment by the government and its allies. At the same time, it is pointed out, it would not be just to tax steel products when they are being supplied to the government on an extremely narrow margin of profit.

The controversy between the Bethlehem Steel Corporation and Atlantic City hotel men with regard to the testing of large shells at the Bethlehem company's proving grounds near Mays landing has been settled. The proving ground is to continue during the war and thereafter if the operations prove damaging to Atlantic City, they will be suspended on notice by the hotel men until legal action can be begun.

Government Needs

In Trinitrotoluol Reveal Shortage of Early Toluol

New York, April 10.—Large inquiries for trinitrotoluol recently issued by the United States government have emphasized the scarcity of toluol and that it is impossible to obtain for immediate shipment such large quantities as are wanted. Considerable new business in toluol, both spot and future, was done with both domestic and foreign consumers, during the week. A large inquiry is pending. Prices are firm and unchanged at $1.75 to $2 per gallon, at producers' plant for spot. Contract remains at $1.50 to $1.75 a gallon. Buying of benzol has been unusually heavy. Very large quantities have been purchased for spot shipment both to domestic and foreign consumers. Although this business has strengthened further the tone of the market, prices are unchanged. Pure benzol is quoted at 55 to 60 cents per gallon at producer's plant, both for spot and contract. Solvent naphtha still is characterized by this weakness. There has been an improvement in this market, however. Better sales are reported and a considerably larger volume of business is pending. Spot solvent naphtha is quoted at 20 to 25 cents per gallon at producers' plant, while the price on contract deliveries is about 18 to 22 cents. The phenol market reflects no development of interest. There are fair supplies but there is sufficient buying to prevent any weakness. Phenol continues to be quoted at 42 to 45 cents, per pound, at producers' plant, for spot, and on contract nominally at 45 cents.

Fertilizer manufacturers continue to purchase spot lots of sulphate of ammonia to see them through the present season. It is expected the coming yearly contracting movement will begin early in May. Current indications are that next year's requirements will be considerably larger than those of last year. Spot sulphate of ammonia is unchanged at $4.70 to $4.80 per 100 pounds, at seaboard. Contract prices remain unfixed.

Coke Oven By-Products

Spot.	
Per Gallon at Producers Plant.	
Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.18 to .25
Per Pound at Producers Plant.	
Phenol	$0.45
Per 100 Pounds at Seaboard.	
Sulphate of ammonia	$4.70 to 4.80
Contract.	
Per Gallon at Producers Plant	
Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.18 to .22
Per Pound at Producers Plant.	
Phenol (nominal)	$0.45
Per 100 Pounds at Seaboard.	
Sulphate of ammonia	no market

Insures Employes

The Elk Fire Brick Co., St. Marys, Pa., put into effect April 1 a plan whereby insurance is provided for all who have been continuously in the employ of the company for a period of three months or more. J. D. Ramsay, president of the company, gives the following outline of the plan:

(1). The policy will become effective April 1, 1917. (2). All employes who have been continuously in the employ of the company for a period of three months or more will be covered under this policy. (3). All employes will be insured without medical examination. (4). The amount of insurance on each will be $500. (5). The amount of each certificate will be increased Jan. 1, 1918, to $600 to all employes who are insured under the policy on July 1, 1917, and who continue in the employ of the concern until Dec. 31, 1917. (6). The insurance will be payable to anyone whom you may designate as your beneficiary. (7). The Elk Fire Brick Co. pays all costs of the insurance and furnishes it free of charge to the employes. (8). The Elk Fire Brick Co. reserves the right to make such changes in this insurance plan on April 1, 1918, as may seem best for the interest of the employes and the company. (9). This plan of insurance has no legal bearing on compensation and does not affect your right under the compensation act in any manner. This is an additional item for you in case of death, either accidental or natural. (10). This plan does not have any bearing on the wages now being paid by the company or on wages paid in the future; it is not given in lieu of wages, but it a form of protection for you and yours. (11). In case of total disability the amount of insurance carried on your life will be payable to you in installments, the details of which will be given later.

The main offices of the J. L. Mott Co., maintained in New York since the corporation was organized in 1883, are to be moved to the company's plant at Trenton.

We Can Strike Through Metal Power

United States Rendered Signally Formidable in War by Its Surpassing Resources In Iron, Steel, Copper, Lead, Spelter and Other Metals of Battle —How the Belligerent Camps Compare

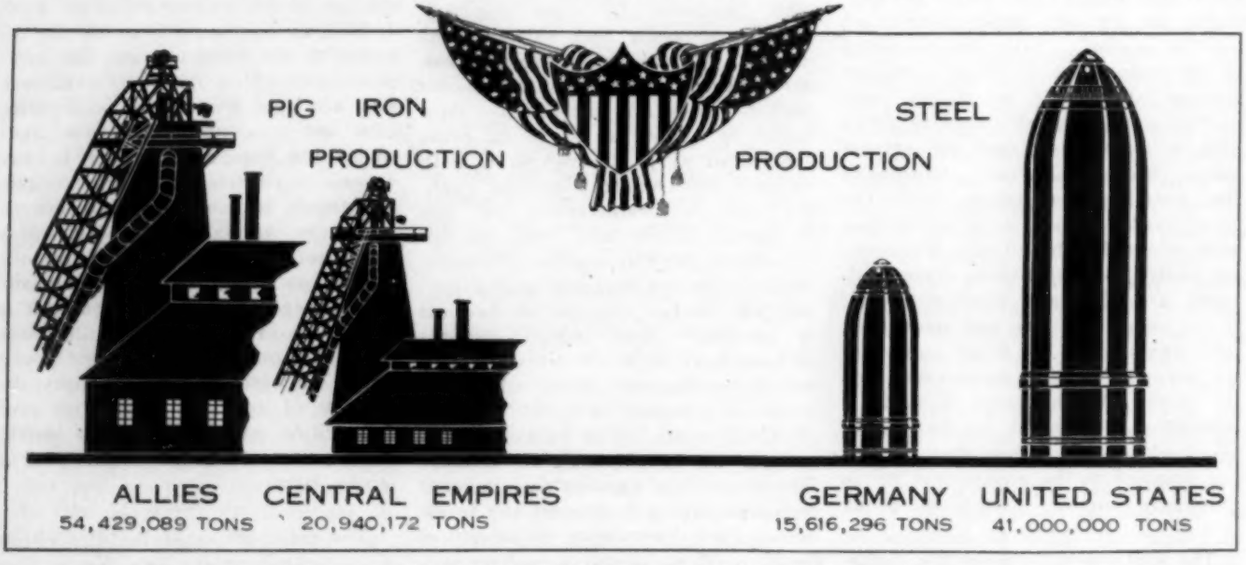
World leadership of the United States as a producer of iron, steel and non-ferrous metals, the very sinews of modern warfare, is about to be exercised to its fullest power in the defense of the nation. Now that the gage of battle has been thrown to Germany, the wide margin of advantage of this country over all other nations in the possession of mineral and manufacturing resources, is being brought into full play. A comparison of the productive potentiality along this line, of the United States and the Central Powers, sharply portrays the surpassing material strength of this country in what has been called appropriately a "war of metals".

The importance of chemistry in prosecuting successful warfare according to modern standards has been recognized generally, but the allied art of metallurgy has proved even more important. Large quantities of steel, copper, lead and zinc have been all essential in providing the necessities of war. For shells, armor plate, ordnance and rifles, the requirements of these metals in the present conflict have been tremendous. Submarines, battleships, aeroplanes, etc., have been demanding structural and protective materials possessing far greater physical properties. Special steels and alloys have been developed to keep pace with tremendous military needs. Steel, by virture of the immense tonnage consumed, is the metal of most vital importance in war, followed by copper, lead, zinc and aluminum in the order of importance. With the entrance of the United States into the far-flung conflict, the position of the allied powers in metal resources is strengthened enormously. This country, with a steel production of about 41,000,000 tons in 1916, and an estimated productive capacity of 48,000,000 tons by the first of 1918, has swung the balance heavily to the side of the entente powers.

The figures given in the accompanying tables are the latest available. They show that the United States stands supreme, not only in the production of steel, but also in that of pig iron, of copper, of lead and of zinc. Statistics of some of the warring nations for the past few years are not at hand.

The relative strength in productive capacity of the various nations at war is shown in Table No. 1. The United States produces more pig iron and steel than the Central Powers combined. Of iron ore, the Central Powers in 1913 mined 33,706,303 metric tons. The United States, in 1916, produced about 77,650,000 tons, of which 66,000,000 tons were shipped from the Lake Superior district. By the fortune of war, many of the French and Belgian mines have fallen into the hands of the Teutonic group and have been operated by the latter. Blast furnaces and steel plants in occupied Belgian and French territory also have been utilized effectively by the Germans for their own purposes. Today the German iron and steel industry proper is yielding about 75 per cent of the 1913 production, which in pig iron was 19,300,000 tons, and in steel about 18,650,000 tons. In 1915, Germany's output of steel, exclusive of that of the plants seized in France and Belgium, was 13,020,000 tons. The production of pig iron of Belgium in 1913 was 2,500,000 tons, and of steel in 1912 about 2,000,000 tons. France, in 1913, manufactured 5,300,000 tons of pig iron. and about 4,400,000 tons of steel. All the Belgian capacity and perhaps 75 to 80 per cent of that of France, is in the hands of Germany. To what extent these plants are being used is not known definitely, though it is certain that the invaders are operating many of them.

The total production of copper by the Central Powers, according to the latest figures of 1913, was 39,223 tons, of which Germany contributed 35,000 tons. The total allied production at present is over 1,000,000 tons, of which the United States furnishes over 88 per cent. The 1916 production of this country was 880,750 tons, the largest output in history. War demands have brought about the exploitation of



THE MIGHT AND POWER OF STEEL AND IRON

A graphic portrayal of the overwhelming superiority of America and her allies in the manufacture of iron and steel—the basic metal from which all implements of war are forged. The two blast furnaces at the left are proportioned to the relative pig iron production of the allies and the central empires. The shells at the right show the relative steel capacity of the United States and Germany

Table I

Comparative Iron and Steel Production, in Tons, of Warring Nations

PIG IRON

Central Powers		Allied Powers	
Germany	13,190,172	United States	39,500,000
Austria-Hungary	1,500,000	Great Britain	10,300,000
Turkey	.....	France	4,500,000
Bulgaria	.....	Russia	2,686,226
Belgian territory occupied	1,250,000	Italy	385,340
French territory occupied	4,000,000	Japan	57,513
		Roumania	.....
		Montenegro	.....
		Serbia	.....
		Portugal	.....
Total	20,940,172	Total	54,429,089

STEEL

Central Powers		Allied Powers	
Germany	15,616,296	United States	41,000,000
Austria-Hungary	2,800,000	Great Britain	8,350,944
Turkey	.....	France	1,200,000
Bulgaria	.....	Russia	5,000,000
Belgian territory occupied	1,000,000	Italy	796,152
French territory occupied	3,000,000	Japan	300,000
		Roumania	.....
		Montenegro	.....
		Serbia	.....
		Portugal	.....
Total	32,416,296	Total	56,647,096

mines, the full possibilities of which had not been proved in the past because of the lack of market demand. Many properties which heretofore were only prospects, have become producing mines. As a measure of the extent to which copper enters into the making of war supplies, the enormous purchases in this country by Great Britain and other allied powers during the past two years offer eloquent demonstration.

In lead, the United States in 1916 produced 606,628 tons. This was more than three times the production of the Central Powers in 1913, which is the latest available record of output. In that year, Germany and her allies produced 205,202 tons. The bulk of this came from Germany. The output of the United States in 1916 added to that of the entente group increased the lead output of these countries to 746,438 tons.

The situation in zinc is similar to that in iron and steel and in copper. The allied nations today have a total production of over 1,000,000 tons. Of this, the United States in 1916 furnished 672,300 tons. Germany and Belgium, before the war, obtained 80 per cent of the Australian output of zinc concentrates. In recent years, Australia had assumed a high rank as a producer of zinc ore, providing one-fifth of the world's supply. Cessation of shipments of these concentrates to Germany and Belgium followed the outbreak of the war. It is apparent that Germany's production of spelter, which in 1913 was 283,113 tons, has fallen off sharply.

Among the metals less important from a tonnage standpoint, but indispensable in warfare, the position of the United States is especially strong. The output of the country in aluminum is the largest in the world. In 1916 it was about 100,000,000 pounds. Though the United States produces no tin, its output of tin plate, the form in which this metal is utilized chiefly in warfare, also excels that of any other nation. The resources of the country in ferro-vanadium, ferro-tungsten and other steel-making alloys so widely needed for war steel, have been greatly increased in recent years and now are more than ample to meet a tremendously increased demand.

Repeated statements to the effect that Germany has sufficient stocks of all metals to carry on many years of war admit of some doubt, according to information recently obtained. The manganese supplies of Germany undoubtedly are at low ebb. Reports are current that that country is attempting to smelt slag discarded from former ferro-manganese operations. Stead, the English metallurgist, when analyzing pieces of exploded shrapnel and other shells fired by the Teutons, found the steel to be in an inferior condition, mainly because of its unusually low manganese content.

Offers Aid

To Government in Obtaining Supplies—Dealers Act

President H. W. Strong, of the National Supply and Machinery Dealers' Association, has notified Secretary of the Navy Daniels and Secretary of War Baker that this organization may be counted on by the government for full co-operation. "It is the purpose of our association," said Mr. Strong to *The Iron Trade Review*, "to be of real service to the government when it needs us. The 130 firms which are enrolled as members carry supplies that will be immediately required. It is our purpose to see that the location of these supplies is known to the federal authorities.

"About one-half of our members are dealers in standard types of machine tools. If for instance, an arsenal should want 200 engine lathes, the government agent would communicate with the proper authorities of our association and immediately telegrams would go out from our headquarters asking members who handle machinery to wire a list of their stocks."

Table II

Comparative Copper and Lead Production, in Tons, of Warring Nations

COPPER

Central Powers		Allied Powers	
Germany	35,000	United States	880,750
Austria-Hungary	3,715	Great Britain	305
Turkey	508	France	11,968
Bulgaria	.....	Russia	16,000
		Italy	1,839
		Japan	90,000
		Belgium	.....
		Roumania	.....
		Montenegro	.....
		Serbia	.....
		Portugal	.....
Total	39,223	Total	1,000,862

LEAD

Central Powers		Allied Powers	
Germany	181,100	United States	606,628
Austria-Hungary	24,102	Great Britain	50,000
Turkey	.....	France	28,817
Bulgaria	.....	Russia	1,000
Belgium territory occupied	*25,000	Italy	20,464
		Japan	3,779
		Roumania	.....
		Montenegro	.....
		Serbia	.....
		Portugal	.....
Total	230,202	Total	710,688

*Estimated.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Actual War Gives Wall Street Shiver

AMERICA'S formal declaration of war changes its position from a mere onlooker to that of an actor in the world drama. The transformation is already being reflected in the business field, for the government is pushing its martial preparations with unexpected energy. Acting wisely, the directors of national affairs have summoned expert advisors from the ranks of industry and commerce who are conducting the preparations in business-like fashion. In this they are assisted greatly by the patriotic response of manufacturers. The iron and steel industry in particular has arranged to "do its bit" and it is a generous bit that it is doing.

But the vigorous action now being taken seems to have caught Wall street somewhat by surprise, prepared though it was for our entrance into the war. Since the President's address of April 2, stocks have declined almost steadily; last week the net losses in many shares ranged from three to five points and more. Yet, a short time ago, there were predictions of a rising market following our declaration of war. The steel stocks again were the most drastic losers last week, as may be noted from the appended table; yet steel is the basic war material.

The reason for this changed attitude, as to the financial effect of war upon our industries, is probably belated realization of these factors: That the scope of our preparations would be so extensive; that low priced government purchases would displace a proportionate amount of more profitable private business; that entente orders might be granted more consideration and lower prices, now that these countries are linked with the United States in a common cause; that corporations may be taxed at a much higher rate than heretofore, in connection with huge war financing.

In most cases, there have been no real reasons for drastic declines. Steel company managements have been discreet in paying dividends and stock prices have been wholly out of proportion with earnings. For instance, United States Steel has been earning fully $50 per share of common, yet it closed last week at 110. Even if its earnings were cut in half, this stock might be valued at more than par. But there is no likelihood of such reduction of profits, for the needs of private buyers must be met, undoubtedly at advancing prices.

Following is a table showing closing quotations April 7 of a number of leading steel and industrial stocks on the New York stock exchange, and net changes for the preceding week:

	Close Apr. 7.	Net chg.
American Can	46	—3
American Can, prfd.	106¼	— ⅞
American Car & Fdy.	66	—3
American Car & Fdy., prfd.	116¼	+ ⅛
American Locomotive	67	—2½
American Locomotive, prfd.	103¼	.....
American Steel Foundries	59	—2⅝
Baldwin Locomotive	58	—1⅜
Bethlehem Steel	135	—8½
Bethlehem Steel, prfd.	120½	.....
Colorado Fuel & Iron	48⅜	—2
Continental Can	91	—1⅝
Continental Can, prfd.	110	.....
Crucible Steel	64	—3¼
Crucible Steel, prfd.	110½	— ½
General Electric	162¼	+1¼
Gulf States Steel	117⅝	—4⅛
Gulf States Steel, 1st prfd.	106⅜	— ¼
International Harv. Corp.	79¼	+ ⅞
Inter. Harv. Corp., prfd.	111	.....
Lackawanna Steel	82½	—3
Nat'l Enmlg. & Stmp. Co.	33⅛	—1⅛
Nat'l En. & Stmp. Co., prf.	98	.....
Pressed Steel Car	75¼	—2½
Pressed Steel Car, prfd.	102	—1
Pullman Palace Car	160	—2
Republic Iron & Steel	78½	—3½
Republic Iron & Steel, prfd.	102⅛	— ⅜
U. S. C. I. P. & Fdy. Co.	19¼	—1¼
U. S. C. I. P. & F., prfd.	55	—3
United States Steel	110⅛	—2⅜
United States Steel, prfd.	117⅜	— ⅛
Westinghouse Mfg.	49⅛	—2⅞

The following table shows maximum quotations of a number of steel and allied stocks not listed on the New York stock exchange, compared as of April 5 and March 28:

	Apr. 5.	Mar. 30.
American Radiator	296	296
American Ship Building	77	79
Cambria Steel	...	111
Chicago Pneumatic Tool	69¼	68½
LaBelle Iron Works	85¼	86½
Lake Superior Corp'n	21⅞	22¾
Stewart-Warner Speed Co.	83	83¾
Warwick Iron & Steel Co.	...	9¼
Westinghouse Air Brake	128½	129
Westingh'se Elec. & Mfg. Co.	53	53

Advance-Rumely Co. Reports

Net earnings for the first year of operation of the Advance-Rumely concern and its subsidiaries reached $283,478, after expenses of operation and interest, this being equal to 2.06 per cent on the $13,750,000 common stock. The Advance-Rumely Co. was incorporated in December, 1915, to take over the business, assets, etc., of the M. Rumely Co. The following comparison of finances at the beginning and end of 1916 was prepared by President Finley P. Mount:

	Jan. 1, '16.	Dec. 31,'16.
Cur. assets less res.	$12,232,369	$12,312,172
Cur. liab. and deben.	4,197,533	3,944,172
Excess. of cur. as.	$8,034,835	$8,368,000
Property account	4,007,312	3,949,596
Deferred charges	35,547	43,577
Goodwill, patents, etc.	14,172,304	14,172,304
Total net assets	$26,250,000	$26,533,478
Preferred stock	12,500,000	12,500,000
Common stock	13,750,000	13,750,000
Surplus	.....	283,478
Total liabilities	$26,250,000	$26,533,478

Haskell & Barker Profits Good

The first year of operation of the Haskell & Barker Car Co., with works at Michigan City, Ind., made a satisfactory showing according to the annual report just made public for the period ending Dec. 31, 1916. On the preferred stock of $165,000 a dividend of 75 cents a share was declared. The balance available for dividends is equivalent to $3.77 a share on the 220,000 outstanding shares. The income account follows:

Gross earnings	$1,135,365
Less repairs, renewals and general maintenance of buildings, machin-	

ery and other equipment.....	305,749
Net earnings	$829,617
Less dividend	165,000
Less reserve for extraordinary renewals and replacements.....	135,000
Surplus for year.....	$529,617

Railroad Earnings Show Decline

Men in the iron and steel industry who have expressed disappointment at the apparent hesitancy of the railroads in coming into the market for their usual large purchases of steel, are finding an explanation of this cautious buying in statements of railroad earnings recently issued. In February the net operating income for the Pennsylvania system amounted to only $580,000, while the New York Central railroad showed a deficit of $2,571,000 for the same month.

These discouraging figures are to some extent the result of the Adamson 8-hour law. Beginning Jan. 1, 1917, the railroads had set aside the amount which was estimated the Adamson law would add to the payroll and after the Supreme Court's decision the roads charged the increase into the February costs. This added expenditure together with the higher operating costs reduced the earnings to the unusually low figure.

Gross operating revenues of the Pennsylvania system in February, 1917, were $31,174,000 and in 1916, $31,596,000. Expenses and taxes this year were $30,537,000, an increase for the month over the same month of last year of $4,697,000. A balance of $5,756,000 shown a year ago was reduced to $637,000 in the second month of 1917.

Gross operating revenues of the New York Central for the month of February was $24,948,000, a decline of $2,308,000. After expenses and taxes there remained a deficit of $2,571,000. A year ago the Central closed the month with a balance of $4,248,000. In other words, the three causes—decrease in business, increase worked by the Adamson law, and the advance in fuel and other costs—took $6,819,000 from the company's earnings of February, 1916. For the two months of January and Februay, despite a gain of $338,000 in gross, the net income decreased $8,385,000.

Enjoins Board

Action has been filed in the United States district court by Henrietta S. Keith, Pittsburgh, which seeks to enjoin the board of directors of the Carbon Steel Co. from paying a 2 per cent dividend to the common stockholders for the fiscal year ending Sept. 30, 1916. A hearing will be held Monday, April 16. Six per cent dividends for the year 1916 had been received by both the common and the second preferred stockholders, and on March 2 the board of directors declared an additional dividend of $60,000 to the common holders. The plaintiff alleges that this dividend violates the rights of the second preferred stockholders, who, it is claimed, are entitled to an equal dividend participation with the common stockholders.

Stock Increase

An increase in the preferred stock of the Western Electric Co. from $15,000,000 to $30,000,000, by the issuance of 150,000 extra shares, was authorized at a special meeting of the stockholders. The plan provides that each holder of common stock will be entitled to subscribe at par for the new preferred issue in accordance with his present common holdings. Retiring directors were re-elected and they subsequently organized without change of officers.

Financial Notes

The Midvale Steel & Ordnance Co. has declared the regular quarterly dividend of $1.50 a share, payable May 1 to holders of record April 20.

The International Nickel Co. has declared its regular quarterly dividend of 1½ per cent on preferred, payable May 1 to stock of record April 14.

At a recent meeting of the stockholders of the American Smelting & Refining Co. the retiring directors were re-elected.

The Cincinnati Screw Co., Cincinnati, has declared a dividend of 1¾ per cent on preferred stock and on common stock placing both stocks on a 7 per cent basis.

The regular quarterly dividend of 1½ per cent on preferred stock, payable April 20, to stockholders of record April 10, was recently declared by the Harbison-Walker Co., Pittsburgh.

The capital stock of the Crescent Insulated Wire & Cable Co., Trenton, N. J., recently was increased from $250,000 to $1,000,000. Considerable extensions to the company's present plant will be made.

A quarterly dividend of 3 per cent on the common stock, payable March 30 to stockholders of record March 28, placing this stock on a 12 per cent annual basis was recently announced by directors of Fairbanks, Morse & Co. The last dividend was at the rate of 10 per cent per annum.

In addition to the regular quarterly dividend of 2 per cent on common stock, an extra dividend of 1 per cent was declared April 4 by directors of the Crocker-Wheeler Mfg. Co., Ampere, N. J., for the quarter ending March 31. The regular quarterly dividend of 1¾ per cent was declared on the preferred stock.

Judge Van Swearingen, at Uniontown, Pa., has authorized receivers of the Tower Hill Supply Co. to pay a fifth dividend of 10 per cent on all debts unpaid on Jan. 5, 1915, when the receivership was created through the J. V. Thompson failures. This means half the company's debts have been paid.

The American Brake Shoe & Foundry Co., New York, announces the second installment of 2 per cent of the 8 per cent dividend on the outstanding preferred stock, and of 1¾ per cent of the 7 per cent dividend on the outstanding common stock, payable March 31, to stockholders of record March 23.

Rebuilding Burned Plant

Detailed plans have been completed and are being executed for rebuilding the burned portion of the plant of the Hydraulic Press Mfg. Co., Mount Gilead, O. The plans provide for the erection of two additional buildings as well as rebuilding four complete structures consisting of a machine shop, a 3-story stock room, a new power plant and a structural and forge shop. The machine shop will be 100 x 200 feet and of fireproof construction. Alongside the new machine shop a 3-story stock room will be erected. This building will occupy a ground space of 50 x 60 feet. A new power plant will also be provided. This building will be 42 x 60 feet and of fireproof construction. The company plans to erect a structural and forge shop adjoining the present erecting shop. This will be 50 x 60 feet. It is planned to have the new buildings in operation by July 1.

Independents Advance Wages

Independent steel companies in the Youngstown district, including the Youngstown Sheet & Tube Co., the Republic Iron & Steel Co., Brier Hill Steel Co., and the Youngstown Iron & Steel Co. have announced a 10 per cent wage increase effective May 1. The increase, follows the 10 per cent advance by the United States Steel Corporation. It will affect about 25,000 men. The common labor rate under the new scale will be approximately 30 cents per hour, an advance of 54 per cent since Jan. 1, 1916. Owners of blast furnaces and steel works in western Pennsylvania and eastern Ohio also have announced wage increases effective May 1.

Builders Favor Government Orders

Tool Manufacturers Making Strenuous Efforts to Satisfy Federal Authorities—Heavy Business is Being Placed—Ship Yards Take Many Machines—Cranes in Demand in Pittsburgh

LEADING machine tool builders are concentrating their attention upon the government's requirements. Little else is being talked of in the trade; private inquiries and sales have been relegated to the background. To date, governmental activity has been confined largely to navy yard and coast defense work, but plans for the immediate future include contracts for small arms and ammunition. The government has asked for rush deliveries on much equipment which originally had been ordered for delivery as far ahead as the latter part of 1918. In addition, much new business has been placed, with the result that many builders have devoted 20 per cent or more of their capacity on government work.

Under such conditions, some confusion exists, but leading builders assert that the men in charge of the government purchasing are going about their work in a business-like way, showing full readiness to cooperate. In turn, the machinery builders have responded patriotically to the call and are putting all their energies behind the government, although a warning is sounded in at least one quarter lest in the rush there be interference with shipments to the allies. Some builders are meeting with much difficulty in obtaining material for use in rush equipment orders. Builders of heavy machinery, for instance, find it almost impossible to obtain heavy forgings, and in such cases the government is able to help little. Production of such material is limited to only a few companies which already are working on government orders.

Ship yard requirements continue to attract considerable interest. The Newport News Ship Building & Dry Dock Co., Newport News, Va., last week placed an order for 57 electric hoists, with the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. The Newport News company is in the market for 10 cranes for two new ship ways it will build in connection with its contract for two battle cruisers. These cranes will be of special construction. Newport News also is in the market for miscellaneous tools, including an 18-inch threading and cutting machine; one 1,000-pound board drop hammer; one 1,000 and one 1,500-pound steam drop hammer; one 24-inch double-gear planer; one 36-inch open-side planer. The Fore River Ship Building Co., Fore River, Mass., which will build one new ship way, will require four 10-ton and one 50-ton cranes, to have 130-foot span. The Delta Ship Building Co., Wilmington, Del., has issued a list of general ship equipment, including punches, shears and joggling machines.

Westinghouse, Church, Kerr & Co. have closed contracts with Pawling & Harnischfeger Co., Milwaukee, for two 15-ton and one 10-ton cranes for the Buffalo, Rochester & Pittsburgh railroad. No action will be taken at this time on the remaining five of the eight cranes originally inquired for by Westinghouse, Church, Kerr & Co., for this railroad. Midvale Steel & Ordnance Co. last week closed for one 10-ton and one 50-ton crane for its Nicetown plant. No action has yet been taken on the 150-ton ladle crane for which Midvale recently made inquiries.

A number of leading machinery houses report that in the past few days private inquiries have become extremely light. Others, on the contrary, say they are receiving a rush of inquiries from users who want to get in ahead of the expected government buying. In some cases private buyers have urged that they receive immediate attention on the ground that such equipment is needed for government work, but builders are acting only on specific advice from Washington in these cases. Only a few scattered railroad inquiries are in the market, including various single machines asked for by the Delaware, Lackawanna & Western. Prices continue to advance in almost all lines in accordance with increased material costs. On April 1 advances of about 10 to 15 per cent were made by several leading builders in the prices of locomotive cranes, car dumpers, ore bridges and ore unloading machinery, ladle cranes and other heavy machinery.

Business Heavy in Pittsburgh

PRESIDENT WILSON'S war message and the entry of the United States into the war have combined to augment activity in the machine tool trade at Pittsburgh. Dealers say inquiries for purely domestic purposes have been coming out in exceedingly heavy volume since April 2. Preparations have been made to meet demands of munition makers. Many dealers are in a position to make immediate deliveries of shell-making equipment. Hundreds of turret lathes in this district will be turned over to the United States, if this equipment is needed. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is sending out a supplemental list, asking bids on a number of light machines for shearing, punching and bending, for installation in the new plant at Essington, Pa. Orders for at least seven punches and shears likely will be placed this week. The Pittsburgh Steel Products Co., a subsidiary of the Pittsburgh Steel Co., Pittsburgh, has entered the market for seven cranes, including two of 10-ton and five of 5-ton capacity. The Pitsburgh Steel Co. has awarded contracts for the erection of a gas producer plant at its works at Monessen, Pa. The Standard Steel Car Co. and the Pressed Steel Car Co., Pittsburgh, continue to negotiate for fabricating machinery.

Chicago Dealers Active

MACHINE tool dealers found that March was an unusual month in volume of business, in some instances making a new record for sales. April promises even better results. Buying of single tools and small lots continues. In addition to the volume of small orders some large business is appearing, which makes the situation the more interesting. Two builders of planers and similar equipment have made advances of 10 per cent recently and other increases are expected to follow.

Armour & Co. are in the market for about 40 tools, including boring mills, radial drills, engine lathes, boiler and structural shop equipment, apparently preparing to do its own structural and car repairing.

THE unusual Construction of a high speed Marine Engine, in which reliability must be secured with as little weight as possible, gives "AGATHON" Steels a splendid opportunity to show up to advantage.

"AGATHON" Steels are for just such purposes, and the fact that they are in such demand is proof enough that they make good.

AGATHON STEELS

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon
"AGATHON" Special Analyses

Our shipping facilities are favorable to speedy delivery anywhere

THE CENTRAL STEEL COMPANY
MASSILLON, OHIO

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, District Representative
Cleveland Office: Hickox Bldg., The Hamill-Hickox Co., District Representative
Chicago Office: Room 1511-12 Lytton Bldg., 14 East Jackson Blvd., A. Schaeffer, District Representative
Philadelphia Office: 902 Widener Bldg., Frank Wallace, District Representative
J. E. Dockendorff & Co., 20 Broad St., New York, N. Y., General Export Agents

A truck manufacturer in Chicago has placed an order for about $18,000 worth of tools. The Nickel Plate railroad has ordered part of its recent inquiry for the Stony Island shop through Chicago dealers, who also booked a comfortable proportion of the New York Central's recent purchases. The Milwaukee road is still considering prices on its list.

Hibbing, Minn., is preparing to build a large municipal powerhouse. At Kaukauna, Wis., plans are being made to build a hydro-electric plant to develop 7,000 horsepower. Lafayette, Ind., may install an electric light plant at the waterworks. The Gary Heat, Light & Power Co. will build a sub-station. The Indian Grove drainage district at Quincy, Ill., will install centrifugal pumps and driving equipment.

The Pacific Construction & Engineering Co. will build a forge shop and power house. The Lipman Car & Refrigerator Co., Beloit, Wis., will build a foundry, machine shop and other shop additions. The Portland Forge & Foundry Co. will build additions to its foundry, drop forge and machine shop. The Turner Mfg. Co., Chicago, is building a powerhouse. The Chicago Screw Co., the James A. Brady Foundry Co. and the Duffin Iron Co., all of Chicago, have bought sites and will build plants. The Globe Ship Building Co., at Superior, Wis., is said to be seeking equipment, including shears, punches and rolls.

Cleveland Market Slow

THERE is little active buying in the Cleveland machine tool market, and many dealers report a severe slackening in inquiries. This condition may be due to the war crisis. Certain tool builders in the east as well as many manufacturers in the Cincinnati and middle western district are paying strict attention to the needs of the government and are not anxious to quote on equipment for future delivery. An interesting phase of the situation with regard to government inquiries is the plan being followed by one tool supply house in Cleveland. This house has examined its books and has looked up every order placed with it during the past three months. If any of these orders have not been filled and the tools specified may be adapted to munition manufacture, these machines are listed in full detail. A further check reveals whether or not they are intended for concerns now making or intending to make munitions. If they are not going into a munition plant they are again listed as tools available for the federal government in case commandeering should be necessary. Several local automobile plants are negotiating with the war department on large orders for automobile trucks to be used as ambulances and armored cars. If any large orders are placed with these companies, it is believed the machine tool business as a result of these orders will be very heavy. There have been no advances in prices, but all quotations are made subject to government requirements.

Business Heavy in Cincinnati

THE demand for machine tools in Cincinnati shows no abatement, despite the fact that the declaration of war with Germany has made the situation somewhat uncertain. Only a few plants are working on foreign orders, and the large majority are ready to meet the needs of the government if called upon for the manufacture of munitions or equipment. No definite information has been received as to what the government will need, or what plants will be asked to work on government orders. Developments of an important nature are expected in the near future. The Indiana Rolling Mill Co., Newcastle, Ind., is contemplating rebuilding that part of its plant recently destroyed by a cyclone. The Acme-Greaves Machine Tool Co., representing a combination of the Acme Machine Tool Co., will build screw machines, engine and turret lathes.

New Construction and Equipment

What it is **Where it is** **Who's doing it**

From the Alleghenies to the Sea

BROOKLYN.—The Atlas Auto Accessories Co. has been incorporated with $50,000 capital to manufacture automobile accessories and specialties by J. T. Condon, G. A. McLaughlin and F. X. Carmody, 1114 Ocean avenue.

BROOKLYN.—The Montrose Improvement Co., Thirteenth and Berry streets, is building a shop and foundry building, to be brick and steel, one and two stories, 80 x 180 feet.

BROOKLYN.—Eberhard Faber Pencil Co. has filed plans for another manufacturing building to be located on Java street, near West street at Greenpoint. The building is to cost approximately $100,000.

BROOKLYN.—Plans have been drawn for a 1-story plant for the W. Beckers Aniline & Chemical Works, Eighty-third street and Ditmas avenue, to be 82 x 165 feet and cost $100,000.

NEW YORK. — The Columbia Malleable Casting Co. has been incorporated with $50,000 capital by F. F. Gearn, W. F. Wood and F. M. Clute 100 Broadway.

NEW YORK.—The Church Street Machinery & Engineering Corporation has been organized with $10,000 capital to manufacture engines and aeroplanes by E. F. Walker, A. D. Sanderson and G. Kroto, 30 Church street.

NEW YORK.—Manhattan Brass Co., 332 East Twenty-eighth street, is about to build a 7-story brick plant.

NEW YORK. — Metal Roofing Materials Co., 203 East 134th street, plans to build a brick or reinforced concrete addition, to be five stories, 30 x 90 feet.

NEW YORK.—The Submarine Power Corporation has been organized with $10,000 capital to manufacture machinery aeroplanes and submarines, by F. Blauvelt, U. G. Dudley and W. B. Cowen, Salem, Mass.

NEW YORK.—The Stylux Mfg. Co. has been incorporated with $10,000 capital to manufacture paints, varnishes, etc., by H. E. Herman, E. A. Falk and J. A. Bravy 254 Saratoga avenue, Brooklyn.

ELIZABETH, N. J.—Samuel L. Moore & Sons Corporation has had plans drawn for an office building to cost $30,000.

HACKETTSTOWN, N. J.—The plant of the Torrid Heater Co. recently was badly damaged by fire.

NEWARK, N. J.—Newark Engineering & Refrigerating Co., 577 South Tenth street, will build a machine shop, 2 stories, 31 x 100 feet, to cost $4,500.

NEWARK, N. J.—Aluminum Goods Mfg. Co., 699 Penfield avenue, will build a plant to cost $250,000. Bids on the general contract closed March 22.

NEWARK, N. J.—Orris Nacht has let a contract for the erection of a 2-story, brick machine shop at 278 Bank street.

NEWARK, N. J. — Contracts have been

Poetic Outbursts of

ROLLING MILL JIM

Two little rolls
Used by us,
Full of holes
Started a fuss.

Two Hubbard Rolls
Used by us,
Without any holes
Ended the fuss.

So long—

Rolling Mill Jim.—

Hubbard Steel Foundry Co.
EAST CHICAGO, IND.
All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

let by Architect Frederick G. Nobbe for additions to the machine shop located at 812 South Eighteenth street.

NEWARK, N. J.—E. F. Heath & Son have let a contract for alterations to their present plant.

NEWARK, N. J.—Newark Engineering & Mfg. Co. has let a contract for alterations to its plant at 476 Eighteenth avenue.

PHOENIX, N. J.—Architects Worthman & Brown, 114 East Twenty-eighth street, New York City, are taking bids on a factory group to be built here for the Phoenix Cornice Works, including a clay preparation building, 120 x 500 feet, a storage shed, 100 x 100 feet, a boiler house, 35 x 122 feet and a storage cellar, 47 x 80 feet, at a cost of $125,000.

AMBRIDGE, PA.—The board of education plans to erect a 2-story addition, 74 x 109 feet, to grade school. W. W. Williams, Magee building, Fourth street, Pittsburgh, is preparing the plans.

BEAVER FALLS, PA. — Union Drawn Steel Co. will build a 2-story machine shop, 80 x 170 feet, to cost $25,000.

EAST BRADY, PA.—The Red Bank Coal Co. has been incorporated with a capital stock of $150,000; by A. B. McGrew, S. M. Parks, A. G. Nesbit, all of Pittsburgh.

EASTON, PA.—Architect W. M. Mishler, Drake building, will receive bids until April 15 on the general contract for a power house to cost $150,000 for the hospital and nurses home, to be 3-story, 165 x 236 feet with a wing 69 x 104 feet.

HAZELTON, PA. — The plant of the Worthington Pump & Machinery Co. was damaged by fire to the extent of $75,000 March 23.

PATTON, PA.—The First National bank plans to erect a 3-story addition to its building, to cost $25,000. H. L. Rinehold, 1309 Walnut street, Philadelphia, is preparing the plans.

PHILADELPHIA. — Plant of the Miller Lock Co., Tacony and Duncan streets, has been slightly damaged by fire.

PHILADELPHIA.—Plans are being drawn for a shop and garage building to be erected at Drexel Hill for the Drexel Hill Motor Co.

PHILADELPHIA.—Bids are being taken on a contract for the erection of a 4-story, 124 x 175-foot addition to the plant of the E. G. Budd Mfg. Co., Huntington Park avenue and King street.

PHILADELPHIA.—Ketchum & McQuade have secured a contract for the erection of a 1 and 2-story addition to the artillery case shop and for a 4-story, 29 x 63-foot addition to the instrument department at the Frankford arsenal.

PHILADELPHIA.—Chester Construction & Contracting Co., 709 Otis building, is taking bids on metal work for power plant of Beacon Light Co., Chester, Pa., total cost of which will be $3,000,000. Plans include boiler house, brick and concrete, 189 x 232 feet, four stories; turbine hall, 4-story, 119 x 258 feet; switch house, 80 x 210 feet, five stories; coal tower, 1-story, 44 x 71 feet and a machine shop, 1-story, 38 x 78 feet.

PHILADELPHIA. — Stead & Miller Co., Fourth and Cambria streets, plans plant addition, 6-8-story, 60 x 90 feet.

PHILADELPHIA.—Architect Herman Miller is taking bids on 5-story plant, to be 39 x 150 feet. Names of owners withheld.

POTTSVILLE, PA.—The blacksmith shop, machine shop and carpenter shop at the Lytle Colliery near Minersville, recently were badly damaged by fire.

PUNXSUTAWNEY, PA. — The Buffalo, Rochester & Pittsburgh Railway Co. plans to erect an 18-stall roundhouse, a locomotive repair shop to cost more than $100,000.

SOUTH BETHLEHEM, PA.—A fire that started in the boiler house of the Bethlehem Foundry & Machine Co. damaged the plant to the extent of $200,000. The chemical laboratory and the pattern storage building suffered the greatest damage.

STONEBORO, PA.—The Sun Coal Co. has been incorporated with a capital stock of $100,000; by L. J. Cann, R. P. Cann, W. J. Houston, Woods Canon, all of Stoneboro; S. M. Stevenson, Grove City.

TURTLE CREEK, PA.—The board of education plans to erect a 2-story high school, to cost $225,000. George H. Schwan, Peoples Bank building, Pittsburgh, is preparing the plans.

WARREN, PA. — The Jacobson Machine Mfg. Co. plans to build an addition to its plant.

WARREN, PA. — The Warren Mirror Works plans to build a mirror factory and boiler house, 70 x 150 feet, to cost $50,000. Frank Grunninger, Wetmore building, is preparing the plans.

WARREN, PA. — The Warren Industrial Development Co. plans to erect a factory, 60 x 200 feet, to cost $25,000. Phillips, Fidler & Beck, Warren Trust building, are preparing the plans.

Activities in the Central States

BUFFALO.—The Rice & Adams Dairy Machinery Co. plans to erect a 3-story factory, 60 x 150 feet, to cost $75,000. G. Morton Wolfe, 1377 Main street, is preparing the plans.

LAUREL HILL, L. I., N. Y.—Nichols Copper Co. will build plant, 105 x 114 feet, to cost $32,000. Plans have been drawn.

MIDDLETOWN, N. Y.—The Bradley Machine Co. has been incorporated with $107,500 capital as machinist and founder, E. N. Oakes, J. Bright and T. Watts, 4 East Main street.

NIAGARA FALLS, N. Y.—Architect F. E. Pierce, 35 Nassau street, New York, has drawn plans for a chemical plant here. Name of the owner is withheld.

NORTH TONAWANDA, N. Y.—R. Wurlitzer Co., 701 Main street, plans to build an addition to its boiler house, 1-story, 18 x 30 feet.

ROCKAWAY PARK, L. I., N. Y.—Queensborough Gas & Electric Co., 347 Central avenue, will build a generator house to cost $10,000.

SOLVAY, N. Y.—Pass & Seymour plan to build a 3-story plant, 60 x 185 feet. J. W. Brooks is manager. Plans have been drawn by Architects Russell & King.

SYRACUSE, N. Y.—Hotaling, Warner Co., 720 North Clinton street, will build a 3-story addition to its boiler house, 39 x 40 feet. Plans have been drawn.

PITTSBURGH. — Harold K. Leitch, Park building, plans to erect a 3-story commercial garage, 62 x 185 feet, to cost $70,000. The Richard Irvin Co., Union Bank building, is preparing the plans.

PITTSBURGH. — The Sweeney Mfg. Co. has been incorporated with a capital stock of $100,000; by Samuel Sweeney, Wilkinsburg, Pa.; Stanley F. Long, H. W. Talmage, both of Pittsburgh.

PITTSBURGH.—A. P. Miller Co. has been incorporated with a capital stock of $40,000 to manufacture roofing materials; by Albert W. Miller, Albert P. Miller and Arnold F. Miller, all of Pittsburgh.

PITTSBURGH. — The Pittsburgh-Racine Rubber Co. has been incorporated with a capital stock of $20,000; by Cleveland Foster, Pittsburgh; Harold B. Underwood, Racine, Wis., and A. T. Morgan, Edgewood, Pa.

PITTSBURGH. — The Pittsburgh Transformer Co. plans to erect a 3-story factory, 80 x 300 feet, to cost $125,000.

CINCINNATI. — Plans have been finished and will be posted soon for an addition to the plant of the Fosdick Machine Tool Co. Dimensions will be 50 x 250 feet, one story. Equipment is being purchased.

CINCINNATI.—The Coffelder-Barth Radiator Co. has been incorporated with $10,000 capital, by C. H. Barth, Thomas Coffelder, C. R. Hicks, J. R. Gunther and Walter Biddinger.

CINCINNATI.—The Cincinnati Pulley Machinery Co. has increased its capital stock from $50,000 to $150,000.

CINCINNATI. — The Monitor Stove & Range Co. is letting contracts for the construction of an addition 80 x 130 feet, two stories. Almost all equipment has been purchased.

DAYTON, O.—The C. J. Weinman Co. has been incorporated with $15,000 capital as machinist by Clarence Peoples, C. J. Falkner, J. G. Collison, C. J. Weinman and others.

MANSFIELD, O. — The National Steel Products Co. has been incorporated with $25,000 capital by Carl Overland, R. W. Martin, C. A. Longsdorf and others.

OSGOOD, O.—The Lippincott Co., Cincinnati, is in the market for two boilers of 225 horsepower each, for a new factory to be built here.

HUNTINGTON, W. VA.—Standard Stamping Co. will build a 1-story plant, 100 x 200 feet. Work will start about April 15.

GRIFFIN, IND.—Bonds have been voted for the construction of an electric light plant.

INDIANAPOLIS.—Irvin Robbins & Co., automobile body makers, have increased their capital from $8,000 to $100,000.

LA FAYETTE, IND.—The city council is considering adding an electric light plant at the waterworks.

LAPORTE, IND.—The Aerothrust Engine Co. has increased its capital from $100,000 to $500,000.

BELLEVILLE. — The Harrison Machine Works is building an addition to its foundry.

CHICAGO. — The Duffin Iron Co. has bought a site at Fortieth and Kedzie avenue and will build a fabricating plant.

CHICAGO. — The Turner Mfg. Co., 1444 South Sangamon street will build a 2 and 3-story power house costing $150,000. A. S. Alschuler, 20 East Jackson boulevard, is architect.

CHICAGO.—The Chicago Screw Co. has bought a 20-acre site and is planning a large modern plant which will cost about $500,000.

CHICAGO.—The Pyott Co. has increased its capital from $50,000 to $150,000.

CHICAGO. — The Champion Foundry & Machine Co., 2423 West Fourteenth street, is about to build a foundry.

MAYWOOD. — A. Kronquist, 514 North

BLACKWOOD STEELS
CLEANING
Blackwood Steel Castings
We do not spoil a perfect start by making a poor finish. Every Blackwood Steel Casting is thoroughly cleaned.
First, all heads, gates and risers are cut off by acetylene torches. The next operation is a careful sandblasting. Then, all small defects, such as blowholes, scratches, cracks, etc., are thoroughly welded. When the welding is finished the grinders get on the job. The next step is to see that the castings are properly annealed, thus removing internal strains; and finally, they are tumbled while hot.
A Perfect Start—A Perfect Finish
That is what you get when you specify Blackwood Quality.
BQB QUALITY SERVICE
Anything up to 500 pounds!
We specialize in Automobile Castings, Electrical Castings, Lead Pots, Case Hardening Boxes, Cut Gear Blanks.
Send us your inquiries and blue prints.
The Blackwood Steel Foundry Co.
SPRINGFIELD, OHIO
BQB QUALITY SERVICE
BLACKWOOD STEELS

Eighth avenue, will build a 2-story factory, 62 x 93 feet for the manufacture of water heaters. F. C. Cloyes, 189 West Madison street, Chicago, is architect.

MILLER, IND.—The John C. Frederickson Mfg. Co. has been incorporated to manufacture air compressors, engines and other devices with $25,000 capital by A. T. Thompson, J. C. Frederickson and H. O. Egberg.

NEW ATHENS.—The Auto Stove Works is building an addition to its foundry and will add to its polishing and nickel plating departments.

QUINCY. — Bids will be received until May 1 by W. A. Grieser, commissioner of Indian Grove drainage district for a pumping plant, including a 54 and a 36-inch centrifugal pump driven by electric motors, oil or steam engines.

STREATOR. — Frank Angier, 116 North Bloomington street, will build a machine shop 50 x 150 feet.

BELOIT, WIS.—The Lipman Car & Refrigerator Co. is having plans made for a new plant including foundry, machine shop, sheet metal shop, wood shop and other buildings. The buildings will be 40 x 250 feet and 50 x 300 feet.

CLINTONVILLE, WIS. — The water and light commission plans a 1-story boiler house 40 x 60 feet. G. C. Stewart is superintendent.

KAUKAUNA, WIS.—The municipal electric and water department plans a hydro-electric plant to develop 7,000 horsepower at 26 feet head by vertical generators. W. B. Montgomery is manager.

MANITOWOC, WIS. — The Aluminum Goods Mfg. Co. has awarded contracts for the erection of a new plant in Newark, N. J., to cost more than $350,000. The work is in charge of Walter W. Oeflein, North Milwaukee, Wis. The new building will be six stories high, 75 x 375 feet in size, of reinforced concrete steel and brick, with steel sash sides, and is to be ready for occupancy on Nov. 1.

RACINE, WIS.—The Osborne Casting Co. has decided to build a large addition at once. Contracts have been awarded for the work.

SOUTH MILWAUKEE, WIS.—The Bucyrus Co., steam shovels, etc., is building a 60 x 180-foot addition to its erecting and assembling shop, to be ready about May 15. The work is being done by the Milwaukee Structural Steel Co.

TOMAH, WIS. — Articles of incorporation have been filed by the Economy Power Appliance Co., Tomah. The capital stock is $10,000 and the incorporators are W. A. Lee, E. H. Manning and W. B. Naylor.

WATERTOWN, WIS. — The Washington Cutlery Co. plans to make enlargements to its plant in the near future which will include a 2-story, 54 x 60-foot brick building.

DETROIT.—The Denby Motor Truck Co. will build an addition 90 x 180 feet, 1-story, to cost $25,000.

DETROIT.—The Ireland & Matthews Mfg. Co., manufacturer of automobile supplies and stove hardware, is building a plant to cost $500,000, including a 4-story building, 60 x 650 feet, and a 1-story, power plant 51 x 178 feet, brass foundry, two stories, 56 x 129 feet and press building 75 x 568 feet.

MILWAUKEE.—The P. & B. Mfg. Co., 504 Matthews building, electrical supplies and goods has awarded contracts for the erection of a new plant, 60 x 200 feet, to be located at Fratney and Becker streets.

WYANDOTTE, MICH.—The Atlas Screen Co. has been incorporated to manufacture wire goods, with $100,000 capital, under a Delaware charter, by John R. Calhoun and W. F. Higgins of Detroit.

Mississippi to the Rockies

SIOUX FALLS, S. D.—The Crab Orchard Iron & Steel Co. has been incorporated with $10,000 capital by Tore Teigen, O. R. Davis and R. A. Teigen.

OMAHA, NEB.—The Owner Crown Tire & Rubber Co. is receiving bids on a 3-story, 60 x 130-foot factory to cost $32,000.

EUFAULA, OKLA.—The Jefferson Highway Bridge Co. has been organized to build a toll bridge over the South Canadian river to cost $150,000. Carl W. Gust is secretary and will ask bids after April 2.

OKLAHOMA CITY, OKLA.—The Automatic Railway Crossing Guard Co. has been incorporated with $200,000 capital by R. W. Mitchell, of Broken Arrow, Okla., and J. R. Burress of Dallas, Tex.

BRAINERD, MINN. — The Northern Pacific railroad, H. E. Stevens, chief engineer, 1210 Railroad building, St. Paul, will build a $10,000, 40 x 45-foot machine shop addition.

CROOKSTON, MINN.—The Pressed Steel Automobile Plug Co. will build a foundry.

EVELETH, MINN.—The Thuren Mfg. Co. has been incorporated to manufacture machinery with $150,000 capital by L. O. McGee and T. H. Peterson.

FAIRBAULT, MINN.—The city of Fairbault plans erecting a municipal electric light plant.

HIBBING, MINN.—Bids are being asked on a municipal power house to cost $200,000. A. L. Pillsbury, Minneapolis, is engineer.

ST. PAUL, MINN. — The Specialty Mfg. Co., John Boos, manager, 1049 Raymond building, will build a factory costing $20,000.

TACOMA.—The city council will probably submit to voters in the near future the question of issuing $4,500,000 in bonds with which to purchase the Hebb power site, develop it to its full capacity of 100,000 horsepower.

ST. LOUIS, MO.—The Railway Tie Corporation, 2007 Railway Exchange building, will build a rolling mill to produce ties, bars, tees and other steel forms.

DAVENPORT, IA. — The Davenport Mfg. Co. has increased its capital from $30,000 to $150,000 and will build and equip a new factory costing $100,000.

The Pacific Coast States

SEATTLE.—The Pacific Metal & Galvanizing Co. has been incorporated with $20,000 capital by C. B. Rhodes and Henry L. Gray.

SEATTLE. — The Pacific Construction & Engineering Co. has had plans prepared for a forge shop 71 x 250 feet and a power house 29 x 37 feet, costing $20,000.

SEATTLE. — The Raun Engineering & Equipment Co. desires catalogues and prices on machinery for a boiler shop structural-plate shop, pipe shop, machine and wood work

SPOKANE, WASH.—K. K. Cutter, architect, 1023 Riverside street, is preparing plans for 6-story building 90 x 100 feet to cost $250,000.

TACOMA.—The Pacific Steel & Boiler Co. is building additions to cost $20,000, the main building is to be 50 x 220 feet.

LONG BEACH, CAL.—The Paschall Tool Co., newly organized, manufacturer of lathe attachments, will build a plant.

LOS ANGELES. — The Moreland Motor Truck Co., 1701 North Main street, has bought a site at Burbank for a new plant.

OAKLAND, CAL.—The Hammer-Bray Co. will build a 1-story foundry on Center street.

ONTARIO, CAL.—The Hotpoint Electric Co., maker of electrical appliances, will build a 1-story addition 45 x 60 feet.

The Dominion of Canada

NEWCASTLE, N. B. — The International Ship Building Corporation, 323 Transportation building, Montreal, Que., has completed plans for the erection of a ship building plant at Newcastle, N. B., and will commence work at once. The plant will cost $2,000,000.

ELMIRA, ONT.—The Elmira Transmission Co. will build dry kilns, molding shop, machine shop, etc. E. Vise is manager of the company.

KITCHENER, ONT.—The Canadian Consolidate Rubber Co. will erect a machine shop to cost $40,000.

LINDSAY, ONT.—The Boving Hydraulic & Engineering Co. will build an addition to its plant at a cost of $20,000 and will require new machinery and equipment.

ST. THOMAS, ONT.—The Spramotor Co., London, Ont., will establish a foundry and machine shop at St. Thomas at a cost of $100,000. W. H. Heard is manager of the company.

TORONTO, ONT. — The Temiskamang & Northern Ontario Railroad plans to spend $876,000 on improvements to its system, of which $250,000 is for 100 new freight cars; $100,000 for the erection of steel bridges; $125,000 for extensions to the Kirkland lake branch; and $143,000 for general construction.

WINDSOR, ONT.—The Canadian plant of the Chalmers Motor Co. was almost totally destroyed by fire which damaged the plant to the extent of $250,000. The loss is fully covered by insurance.

REGINA, SASK.—The city council is receiving prices on an electric pump, 3,000,000 gallons capacity, a 2,200-volt alternating current motor. Two similar units will be installed at a later date. J. R. Ellis, 2852 Rae street is architect.

CRAWFORD ORE

LAMBERT ORE

PENNINGTON ORE

From Our Open Pit Mines
For Making BASIC and FOUNDRY Irons

Coarse Structure—Desirable Analysis

The Tod-Stambaugh Company
Perry-Payne Building
CLEVELAND - - OHIO

Say you saw it in THE IRON TRADE REVIEW

New Trade Publications

TOOL STEELS. — A 40-page catalog recently issued by the Hammond Steel Co., Syracuse, N. Y., is devoted to tool steels. Among the different kinds described are carbon steels, cutting steels, drawing die and non-shrinkable oil hardening steels. A high speed steel designed for purposes where it is necessary to use a product of high tungsten percentage is also described. This steel is particularly designed for dies of different types, shear blades and milling cutters.

FIRE ALARM AND DETECTOR.—Illustrations and a description of an automatic fire alarm and detector recently put on the market are contained in a circular issued by the New York Brass Foundry Co., 102 Centre street, New York. This apparatus consists of an electric bell in conjunction with an instrument designed on the principle of a thermometer. It may be used in all kinds of buildings, in the holds of vessels and wherever there is risk of fire.

TOOL STEELS. — The Vanadium-Alloys Co., Pittsburgh, recently issued a folder describing three grades of carbon tool steels. These steels are made by the crucible process and are designed to be used for such tools as taps, reamers, milling cutters and lathe tools, shear blades, punches, dies, etc. They are furnished in all ordinary shapes of hammered and rolled bars, disks, and special forgings. A considerable portion of the folder is also given over to rules for the proper hardening of water hardening steels.

DRILLING MACHINES.—The Langelier Manufacturing Co., Providence, R. I., is distributing an eight-page folder devoted to belt-driven ball-bearing drilling machines. Each type of machine is illustrated and described by complete specifications. The standard equipment of these machines includes foot feed in addition to the hand feed. One belt and one hole depth gage is shipped with each machine. In the two-spindle type drill each spindle may be run or stopped independently of the other. The drills are equipped with automatic oil feeds with foot-controlled automatic shut-offs.

VALVES.—A folder devoted to a description of valves was recently issued by the Wm. Powell Co., Cincinnati. All parts of the valves are cast of gun-metal composition, excepting the discs, which are cast of white bronze, having a melting point of 2,000 degrees Fahr. The discs are regrindable, reversible and renewable. The bevel ground joint connection between bonnet and body neck secured by a hexagon union swivel nut is said to insure a steam tight joint under all pressures. The stems are packed with a drive gland in the stuffing box, ample space being provided for packing.

DROP HAMMERS. — A 64-page bulletin describing and illustrating automatic drop presses is being distributed by the Standard Machinery Co., Auburn, R. I. These hammers are made in 10 different sizes with hammers rangings in weight from 50 to 1,200 pounds. The anvil is made extra heavy in proportion to the weight of the hammer, while the poppets are made from forged steel. They are held in place by dowel screws. Poppet screws are made from crucible steel. The uprights are fastened to the anvil by heavy bolts with check nuts. Drop press countershafts are fitted with either plain flange pulleys or patent lifters.

PUNCHES AND SHEARS.—The Hendley and Whittemore Co., successors to Slater, Marsden & Whittemore Co., recently issued a catalog devoted to its entire line of punches, shears and wood working machinery. Much space in the catalog is devoted to combined punching and shearing machines. In these machines, the body is cast in one piece, as is also the eccentric and eccentric shaft. The clutch is of the positive four-jaw type and is thrown in gear by means of a foot lever. The knives are adjustable and reversible, thus providing four cutting edges. All machines are furnished with punch, die and back gauge. When required they can also be equipped with angle shearing attachments for special work.

PNEUMATIC TOOLS. — The Independent Pneumatic Tool Co., Chicago, recently issued a catalog devoted to the company's complete line of pneumatic tools and electric drills. It is said that piston air drills are now equipped with pressed vanadium steel connecting rods and pistons. Concise descriptions accompany the illustration of each tool and each individual part. In the electric drills the windings are all enclosed; the countershaft and spindle are supported on roller bearings as they run at a slower speed. The large size drills have large bronze plain bearings at the lower ends of the spindles. This construction provides for side thrusts placed upon them by the forcing of the drills or reamers through the work.

OVERHEAD CARRYING SYSTEMS.—An attractive 56-page bulletin devoted to a description of overhead carrying systems was recently issued by the Coburn Trolley Track Mfg. Co., Holyoke, Mass. Coburn track systems are made in four sizes with carrying capacities ranging up to 4,000 pounds. Single, double and quadruple carriers are furnished according to the capacities of the hoists. The bulletin also describes electric hoists, track tipping buckets, ladle frames, jib cranes, etc. A unique self locking, wood tackle block is also described. The blocks will stop and lock automatically wherever needed, and can be used at any height. They are said to work upside down, horizontally, or at any angle. Only one rope or chain is used in hoisting or lowering.

DUPLEX PUMPS.—An eight-page folder devoted to the design and construction of duplex pumps was recently issued by Dean Bros., Indianapolis. Each individual part of the pump is separately described and several advantages are claimed for the pumps. The stuffing boxes are said to be easily accessible and all parts of the pump can be reached with an ordinary monkey wrench. The cradle is built up independent of the cylinders and the cross head is guided on the lower cradle bar. The lever is all in one piece and operates on a steel lever stud. The levers are duplicates of each other and interchangeable. Valve gears and levers are placed inside the cradle. The valve gear is rigid. Both gear brackets are fastened to the cradle bars with two set studs on each bracket.

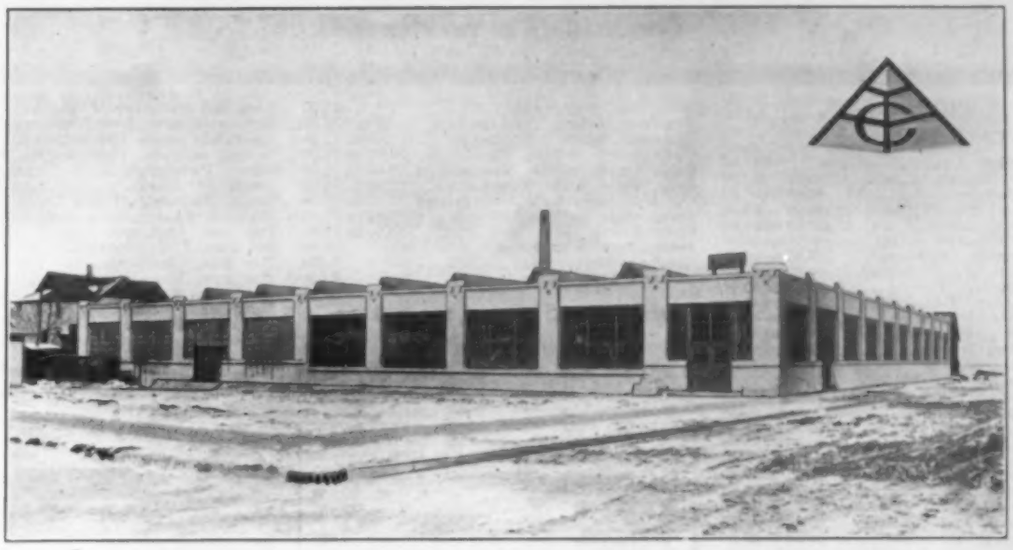
DUPLEX DRY VACUUM PUMPS.—Duplex dry vacuum pumps, built in both steam and power driven types are comprehensively illustrated and described in a 24-page booklet recently issued by the Ingersoll-Rand Co., Broadway, N. Y. The cylinders of the pumps are bolted to the frame, and the bearings are an integral part of the frame. The fly wheel is hung centrally of the machine. As the pumps are of the entirely enclosed duplex type, practically the only moving part visible when the pump is in operation is the fly-wheel. The method of lubrication is a bath system, so that the cover plates can be removed without any danger of oil being thrown out. The main frame is a heavy structure of box pattern. On pumps of 16-inch stroke and smaller the frame is a single casting. Connecting rods are of open hearth steel.

VARIABLE - SPEED MOTORS. — The Sprague Electric Works, New York, has issued a new bulletin describing its variable-speed, single-phase, alternating-current motors. The new motors are a recent development of the company's repulsion-type motors and are built in sizes varying from 1/6 to 7½ horsepower; 1,200 to 1,800 revolutions per minute. The standard motors are supplied for a number of different cycles and voltages. The speed variation is obtained by shifting the motor brushes. No transformers or rheostats are used. The standard machines are designed for 50 to 65 per cent speed reduction under full-load torque. Speed reduction down to 50 per cent at ¾ rated torque, or to 1/3 of full speed at the full rated torque, can be obtained where such variation is desired. These motors are suitable for driving fans and blowers and for operating printing presses. They are not suitable, however, for operating machine tools.

CORKBOARD ISOLATION.—A comprehensive booklet devoted to a description of the use and application of corkboard as a sound-deadener was recently issued by the Armstrong Cork & Insulation Co., Pittsburgh. Noise and vibrations have long been recognized as undesirable but little has been done in past years with the object of reducing or eliminating them except in hospitals, hotels, etc. Noise is the direct result of vibrations and in consequence can only be eliminated in the same proportion as the vibrations are eliminated. There are two ways, according to the Armstrong company, in which this may be accomplished: First, by anchoring the machine to a foundation too massive to be set in motion by the vibrations generated by its operation; second, by isolating the machinery, that is by placing it upon a material of such structure that the vibrations will not readily pass through it, but will be absorbed. Corkboard is said to fulfill the requirements of the alternative.

SHEET METAL PRODUCTS.—A 20-page booklet devoted to a description of sheet metal products, particularly open hearth iron, and profusely illustrated with pictures showing installations of equipment was recently issued by the Newport Rolling Mill Co., Newport, Ky. Open hearth iron is recommended, owing to its rust resisting qualities. In a brief introduction it is stated that in former days when comparatively small amounts of iron were manufactured, such care was taken to eliminate impurities that an almost rust-proof iron resulted. It is said that the combined amount of carbon phosphorus, manganese, sulphur and silicon in the open hearth iron manufactured by the Newport company does not exceed one-eighth of 1 per cent.

An interesting test is graphically illustrated in the bulletin. Samples of open hearth iron, charcoal iron, and steel were immersed in sulphuric acid for 75 hours. At the expiration of that period the open hearth iron lost only 0.60 per cent of its volume.



Walker Manufacturing Company, Racine, Wisconsin

How Arnold Methods Solved the High Cost of Building Under Present Conditions

IF INTENDING to build, you, like hundreds of other manufacturers are seeking a means of coping with the present high cost of building. Perhaps you have partially solved the problem, but under present conditions, every possibility for economizing should be investigated.

The building illustrated is a good example of what Arnold Methods have accomplished in the reduction of building costs, yet maintaining the high standard of design and construction we have adhered to for the past twenty years. Practically sixty days from the first broken ground, this new factory for the Walker Manufacturing Company of Racine, Wisconsin, was completed, and all equipment installed and the plant in operation within ninety days from the date of starting work. We made the plans for building and equipment ready for service, and planned to suit present building conditions, designing a special type of steel construction requiring minimum shop work in making. The steel was delivered in two weeks. We originated a new method of providing a fireproof roof, using Structolite in ten foot spans, the first building of its kind in the United States. This, together with other new ideas, made possible a modern structure entirely of non-inflammable materials, at a saving of thirty per cent. over the cost of similar buildings and at a further great saving in time.

What Will the Arnold Methods Save You?

Ask yourself this question, then seek the answer by explaining your problem to us. We will estimate our value to you and submit data from which you can make your own comparisons. Capitalize this suggestion now.

THE ARNOLD COMPANY

ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL

CHICAGO: 105 South LaSalle St. NEW YORK: 111 Broadway

Interior View

Say you saw it in THE IRON TRADE REVIEW

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery this year.)

Bessemer valley	$40.00
Bessemer, Pittsburgh	42.95
Basic, Pittsburgh	38.95 to 40.95
Basic, eastern Pa.	36.00 to 38.00
Basic, Buffalo	39.00 to 40.00
Malleable, Pittsburgh	39.95 to 40.95
Malleable foundry, Chicago	38.00 to 39.00
Malleable foundry, Philadelphia	40.50 to 41.00
Malleable foundry, Buffalo	39.00 to 40.00
No. 1X foundry, Philadelphia	41.50 to 42.00
No. 2 foundry, Pittsburgh	39.95 to 40.95
No. 2 foundry, Cleveland	39.30 to 40.30
No. 2 foundry, Ironton	37.00 to 38.00
No. 2 foundry, Chicago	39.00
No. 2X foundry, Philadelphia	41.00 to 41.50
No. 2X foundry, N. J. tidewater	41.00 to 41.50
No. 2X foundry, Buffalo	40.00
No. 2 plain, Philadelphia	40.50 to 41.00
No. 2 plain, N. J. tidewater	40.50 to 41.00
No. 2 plain, Buffalo	39.00
No. 2 southern, Birmingham	35.00 to 37.00
No. 2 southern, Cincinnati	37.90 to 39.90
No. 2 southern, Chicago	36.00 to 38.00
No. 2 southern, Phila. delivery	40.00 to 40.50
No. 2 southern, Cleveland	39.00 to 40.00
No. 2 south'n, New York docks	39.25 to 40.25
No. 3 southern, Boston docks	39.50 to 40.50
No. 2 south. interior, New Eng.	40.00 to 41.00
No. 2 southern, St. Louis	35.40 to 38.40
Virginia, No. 2X, furnace	38.00
Virginia, No. 2X, Philadelphia	40.75
Virginia, No. 2X, Jersey City	41.00
Virginia, No. 2X, Boston points	41.25
Gray forge, eastern Pa.	38.00 to 38.50
Gray forge Pittsburgh	38.95
Gray forge, Birmingham	34.00
Silveries, 8 per cent, furnace	46.00 to 48.00
Silveries, 8 per cent, Chicago	45.00
Low phos. Standard, Phila.	73.00 to 78.00
Low phos. Lebanon, Pa., furnace	65.00 to 70.00
Low phos., Pittsburgh	60.00 to 61.00
Charcoal, Lake Superior, Chgo.	41.00 to 41.50
Charcoal, Buffalo	40.00 to 42.00
Charcoal, Birmingham	27.00 to 28.00

IRON ORE

Lake Superior Ores.	Lower Lake Ports.
Old range Bessemer, 55 per cent, ton	5.95
Mesabi Bessemer, 55 per cent, ton	5.70
Old range non-Bess., 51½ per cent, ton	5.20
Mesabi non-Bess., 51½ per cent, ton	5.05

Port Henry Ores. Per unit delivered eastern Pa. All non-Bessemer.

Old Bed, crude, 58 per cent.	10.50c to 11.00c
Old Bed, concent., 65 per cent	11.00c to 11.50c
Harmony concent., 63 per cent	11.50c to 11.75c
Lump (at mines)	$5.75

COKE

(At the ovens.)

Connellsville furnace	$8.00 to 8.25
Connellsville fur., cont.	7.00 to 8.00
Connellsville foundry, contract	8.00 to 9.00
Connellsville foundry	9.50 to 10.00
Wise county furnace, contract	6.50 to 9.00
Wise county foundry, contract	7.00 to 10.00
Pocahontas furnace, contract	6.50 to 9.00
New River foundry, contract	7.00 to 10.00
New River furnace, contract	6.50 to 9.00

FERRO ALLOYS AND STEEL MAKING METALS

Ferro manganese, 80 per cent, delivered prompt	$325 to 375
Ferro manganese, 80 per cent, seaboard and deli'd, contract	210 to 250
Spiegel, 20 per cent furnace by October	75.00 to 80.00
Spiegel, 20 per cent, furnace, last quarter	60.00 to 65.00
Ferro-silicon, 50 per cent, Pbgh., nominal	175 to 225

Bessemer ferro-silicon, 9 per cent $54.00; 10 per cent, $55; 11 per cent, $57.50; 12 per cent, $60; 13 per cent, $65.00 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

SEMI-FINISHED MATERIAL

Open hearth billets, Phila.	$75.00 to 80.00
Forging billets, Philadelphia	100.00
Forging billets, Pbgh., nominal	90.00 to 100.00
Forging billets, Chicago	70.00
Wire rods, Pittsburgh	85.00
Bessemer billets, Youngstown	70.00 to 75.00
Bessemer billets, Pittsburgh	$70.00 to 75.00
Open hearth billets, Pittsburgh	70.00 to 75.00
Open hearth billets, Youngstown	70.00 to 75.00
Bess. sheet bars, Youngstown	70.00 to 75.00
Op. h'th sheet bars Youngstown	70.00 to 75.00
Bess. sheet bars, Pittsburgh	70.00 to 75.00
Open hearth sheet bars, Pbgh.	70.00 to 75.00
Muck bars, Pittsburgh	60.00
Grooved steel skelp	3.60c
Sheared steel skelp	4.50c

RAILS AND TRACK MATERIAL

(Gross tons.)

Stand. Bes. rails, Pbgh. & Chgo.	$38.00
Stan. op.-h'th rails, Pbgh. & Chgo.	40.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.25 to 1.60
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (all rail)	6.15
New York (r. and w.)	4.25
Philadelphia (all rail)	5.20
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:—	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:—	
Minneapolis-St. Paul	$1.25
Mayville, Wis:—	
Minneapolis-St. Paul	$1.75

Light rails, 8 to 10 lbs., Pbgh.	58.00
Light rails, 8 lb., Chicago	58.00
Light rails, 12 to 14 lbs., Pbgh.	57.00
Light rails, 12 lbs., Chicago	57.00
Light rails, 16 to 20 lbs., Pbgh.	56.00
Light rails, 16 to 20 lbs., Chgo.	56.00
Light rails, 25 to 45 lbs., Pbgh.	55.00
Light rails, 25 to 45 lbs., Chgo.	55.00
Relaying rails, standard, Pbgh., and Chicago	$38.00 to 40.00
Relaying rails light, Chicago	40.00
Relaying rails, light, St. Louis	44.00 to 46.00
Spikes, railroad, Pittsburgh	3.65c
Spikes, railroad, Chicago	3.70c to 3.80c
Track bolts, Pittsburgh	4.60c to 4.75c
Track bolts, Chicago	4.50c to 4.60c
Tie plates, Chicago	$60.00 to 65.00

SHAPES, PLATES AND BARS

Structural shapes, con. Pbgh.	3.60c
Structural shapes, Philadelphia	3.759c to 4.409c
Structural shapes, New York	3.769c to 4.419c
Structural shapes, Chicago	3.79c to 4.50c
Tank plates, Chicago	4.69c to 6.50c
Tank plates, Pittsburgh (con.)	4.50c to 4.75c
Tank plates, Pittsburgh	5.00c to 5.50c
Tank plates, Philadelphia	4.659c to 6.659c
Tank plates, New York	4.669c to 6.669c
Bars, soft steel, Chicago	3.54c to 4.00c
Bars, soft steel, con. Pbgh.	3.35c
Bars, soft steel, New York	3.519c to 3.919c
Bars, soft steel, Philadelphia	3.509c to 3.909c
Hoops, carloads, Pbgh. contr.	4.10c to 4.25c
Hoops, Pittsburgh	4.25c to 4.50c
Bands, Pittsburgh	4.10c to 4.35c
Bands, Pittsburgh (contr.)	3.35c
Shafting, Pbgh. contr. carloads	10 to 5 off
Bar iron, Chicago	3.25c
Bar iron, Philadelphia	3.659c
Bar iron, Cleveland	3.00c
Bar iron, New York	3.669c
Bar iron, Pittsburgh	3.25c to 3.50c
Hard steed bars, Chicago	3.25c
Cut nails, Pittsburgh	3.50c

SHEETS

(In cents per pound.)

(Open hearth material takes 25c above prices of bessemer.)

SHEET MILL BLACK.

Gage.	Bessemer.
17 to 21	5.30 to 6.80
22 to 24	5.35 to 6.85
25 and 26	5.40 to 6.90
27	5.45 to 6.95
28	5.50 to 7.00
29	5.55 to 7.05
30	5.65 to 7.15

TIN MILL BLACK.

Gage.	Bessemer.
15 and 16	5.20 to 6.70
17 to 21	5.35 to 6.85
22 to 24	5.40 to 6.90
25 to 27	5.45 to 6.95
28	5.50 to 7.00
29	5.55 to 7.05
30	5.60 to 7.10

GALVANIZED.

Gage.	Bessemer.
10 and 11	6.00 to 8.00
12 to 14	6.10 to 8.10
15 and 16	6.25 to 8.25
17 to 21	6.40 to 8.40
22 to 24	6.55 to 8.55
25 and 26	6.70 to 8.70
27	6.85 to 8.85
28	7.00 to 9.00
29	7.25 to 9.25
30	7.50 to 8.50

BLUE ANNEALED.

Gage.	Bessemer.
3 to 8	5.00 to 6.50
9 to 10	5.00 to 6.50
11 to 12	5.00 to 6.50
13 and 14	5.00 to 6.50
15 and 16	5.00 to 6.50

No. 28 black, Chicago	5.94c to 6.19c
No. 28 galvanized, Chicago	7.19c to 7.69c
No. 10 blue annealed, Phila.	6.159c
No. 10 blue annealed, Chicago	5.44c to 5.69c

TIN PLATE

Tin plate, 100 lb., coke base, contract	7.50c to 8.50c
Tin plate, coke base, prompt	8.50c to 10.00c
Terne plate I. C.	7.15c to 7.40c
Terne plate long	7.00c to 8.00c

IRON AND STEEL PIPE

(Price adopted April 2, 1917.)

Steel.

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
⅛, ¼ and ⅜, butt	48	21½
½, butt	52	37½
¾ to 3, butt	55	41½
2, lap	48	35½
2½ to 6, lap	51	38½
7 to 12, lap	48	34½
13 and 14, lap	38½	....
15, lap	36	....

Iron.

(Prices adopted April 2, 1917.)

Standard weight, threads and couplings, diam. in inches.	Black. Per cent off.	Galv. Per cent off.
⅛ and ¼, butt	36	9
⅜, butt	37	10
½, butt	41	23
¾ to 1½, butt	44	28
1¼, lap	29	14
1½, lap	36	22
2, lap	37	23
2½ to 6, lap	38	26
7 to 12, lap	37	25

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	36

IRON AND STEEL PRICES

Corrected up to Tuesday noon

WIRE PRODUCTS

(Adopted March 5, 1917.)
(Retailers' prices 5 cents above jobbers' quotations).

Wire nails, jobbers', Pittsburgh	$3.20
Coated nails	3.10 to 3.15
Plain wire, jobbers', Pittsburgh	3.15
Galvanized wire, jobbers', Pbgh.	3.85
Polished staples, Pbgh.	3.35
Galvanized staples, Pbgh.	4.05
Barb wire, painted jobbers', Pbgh.	3.35
Barb wire, galv., jobbers', Pbgh.	4.05

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts ⅜ x 6 inches, smaller or shorter, rolled thread, 40 and 10; cut threads, 40 and 2½, larger or longer, 30 and 5.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter rolled 50; cut, 40 and 10; larger or longer, 35 and 5.

Cold pressed, semi-finished hexagon nuts, 50, 10 and 5.

Gimlet and cone point lag bolts, 50. Hot pressed square nuts, blanks, $2.50 off; tapped $2.30 off. Hot pressed hexagon nuts, blank, $2.50 off; tapped, $2.30 off.

Cold pressed square nuts, blank, $2.10 off; tapped, $1.90 off. Cold pressed hexagon nut, blank, $2.25 off; tapped, $2.00 off.

RIVETS

Structural rivets Pbgh.	4.75c
Boiler rivets, Pbgh.	4.85c
Tinner's rivets, 40 and 10 off, Pittsburgh.	

STEEL SHEET PILING

(Pittsburgh).

Base sizes	3.35c

STANDARD STEEL CHAIN

Chain, ⅜ inch proof coil	7.00c

COLD ROLLED STRIP STEEL

Base price, 7.00c to 8.00c per 100 pounds, hard, coils 1½ inches and wider and by .100 inch and heavier.

CAST IRON WATER PIPE

Four inch, Chicago	$53.50
Six-inch and larger, Chicago	50.50
Six-inch Class B, New York	50.50
Four-inch Class B, New York	53.50
Four to six-inch, Birmingham	48.00 to 50.00
Six-inch and larger, Birmingham	44.00 to 46.00

Light weight water and gas pipe $1 per ton higher than standard water.

WAREHOUSE PRICES

Steel bars, Chicago	4.25c
Steel bars, Cleveland	4.35c
Steel bars, Detroit	4.25c
Steel bars, Philadelphia	4.50c
Steel bars, New York	4.35c
Steel bars, St. Louis	4.30c
Steel bars, Cincinnati	4.35c to 4.45c
Steel bars, St. Paul	4.35c
Steel bars, over 2-in., Buffalo	4.50c
Steel bars, Buffalo	4.40c
Iron bars, Chicago	4.25c
Iron bars, Cleveland	4.30c
Iron bars, Detroit	4.00c
Iron bars, St. Louis	4.25c
Iron bars, Cincinnati	4.15c to 4.45c
Iron bars, Philadelphia	4.25c
Iron bars, New York	4.00c to 4.25c
Shapes, Chicago	4.50c
Shapes, Detroit	4.50c
Shapes, St. Louis	4.55c
Shapes, St. Paul	4.60c
Shapes, New York	4.50c
Shapes, Cleveland	4.60c
Shapes, Philadelphia	4.50c
Shapes, Buffalo	4.60c
Shapes, Cincinnati	4.60c
Plates, Chicago	6.00c
Plates, Detroit	5.50c
Plates, St. Louis	6.05c
Plates, St. Paul	6.10c
Plates, New York	6.00c
Plates, Cleveland	5.50c
Plates, Philadelphia	6.50c
Plates, Cincinnati	5.50c
No. 10 blue anl. sheets, Chicago	5.50c
No. 10 blue anl. sheets, Clevel'd	5.50c
No. 10 blue anl. sheets, Buffalo	4.50c
No. 10 blue anl. sheets, St. L.	5.55c
No. 10 blue anl. sheets, Cincin.	5.50c
No. 10 blue anl. sheets. St. Paul	5.60c
No. 10 blue anl. sheets, Detroit	5.75c
No. 28 black sheets, Chicago	5.65c
No. 28 black sheets, Cleveland	6.00c
No. 28 black sheets, Cincinnati	5.65c
No. 28 black sheets Detroit	5.90c
No. 28 black sheets, St. Louis	6.00c
No. 28 black sheets, St. Paul	5.75c
No. 28 galv. sheets, Chicago	7.75c
No. 28 galv. sheets, Cleveland	7.75c
No. 28 galv. sheets, Cincinnati	7.50c
No. 28 galv. sheets, Detroit	8.00c
No. 28 galv. sheets, St. Louis	8.10c
Hoops, Cleveland	5.50c
Hoops, Detroit	4.75c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	16.50 to 17.00
Bundled sheets, Cleveland	16.00 to 16.25
Bundled sheets, Buffalo	15.50 to 16.00
Frogs, switches, guards, St. L.	26.00 to 26.50
Heavy melting steel, Pittsburgh	30.00
Heavy melting steel, Buffalo	25.00 to 26.00
Heavy melting steel, Chicago	26.00 to 26.50
Heavy melting steel, Cleveland	26.00 to 27.00
Heavy melting steel, Cincinnati	23.50 to 24.50
Heavy melting steel, eastern Pa.	24.50 to 25.00
Heavy melting steel, New York	22.00 to 22.50
Heavy melting steel, St. L.	26.50 to 27.00
Heavy melting steel, Birmingham	17.00 to 17.50
Hydraulic pressed sheets, Cleve.	21.00 to 22.00
Hydraulic pressed sheets, Pitts.	20.50 to 22.00
Hydraulic pressed sheets, Chgo.	19.50 to 20.00
Low phos. steel, Buffalo	33.00 to 36.00
Low phos. steel, Pittsburgh	34.00 to 35.00
Low phos. steel, eastern Pa.	33.00 to 35.00
Shoveling steel, Chgo.	24.75 to 25.75
Shoveling steel, St. Louis	21.50 to 22.00
Steel rails, short, Chicago	32.00 to 32.50
Steel rails, short, Cleveland	30.00 to 31.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—

New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	83.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama canal	61.0 cents

Steel rails, short, St. Louis	27.50 to 28.00
Steel rails, old, Birmingham	21.00 to 22.00
Stove plate, Chicago	13.00 to 13.50
Stove plate, Cleveland	15.00 to 15.50
Stove plate, Cincinnati	11.25 to 11.75
Stove plate, St. Louis	13.50 to 14.00
Stove plate, N. J. points	16.00 to 16.50
Stove plate, Birmingham	11.50 to 12.00
Stove plate, Buffalo	16.50 to 17.00
Stove plate, eastern Pa.	18.00 to 18.50
Stove plate, Pittsburgh	15.00 to 15.50

(Net Tons)

Boiler plate, cut, No. 1, Chicago	18.00 to 18.50
Boiler plate, cut, No. 1, St. L.	15.50 to 16.00
Bundled sheet, Cincinnati	14.00 to 14.50
Knuckles, coup., Chicago	29.75 to 30.25
Knuckles, coup., St. Louis	26.00 to 26.50
Springs, Chicago	30.00 to 30.50

IRON MILL USE

(Gross Tons)

Angle bars, st. sect., Pbgh., base	2.75c to 3.25c
Angle bars, st. sections, Chgo.	2.75c to 3.00c
Busheling No. 1, Buffalo	21.50 to 22.00
Busheling, No. 2, Buffalo	14.00 to 14.50
Busheling, No. 1, Pittsburgh	20.00 to 21.00
Cast borings, New York	12.50 to 13.00
Cast borings, eastern Pa.	15.50 to 16.50
Cast borings, Buffalo	13.00 to 13.50
Cast borings, Pittsburgh	14.75 to 15.00
City wrought, New York	24.00 to 24.50
Cut forge, Chicago	26.50 to 27.00
Forge flash'gs, un. 10 in., Cleve.	21.50 to 22.00
Forge flash'gs, ov. 10 in., Cleve.	21.00 to 21.50
Forge, No. 1, eastern Pa.	17.00 to 18.00
Grate bars, Buffalo	16.50 to 17.00
Grate bars, N. J. points	16.00 to 16.50
Iron axles, Pittsburgh	43.00 to 48.00
Iron axles, Cincinnati	43.00 to 43.50
Iron axles, eastern Pa.	38.00 to 40.00
Iron axles, Chicago	45.00 to 46.00
Iron axles, Buffalo	45.00
Iron rails, Chicago	30.50 to 31.00
Iron rails, Buffalo	26.00 to 26.50
Iron rails, Cincinnati	27.00 to 27.50
Iron rails, St. Louis	29.00 to 30.00
Iron rails, Cleveland	30.00 to 31.00
Machine shop turnings, Buffalo	11.50 to 12.00
Mch. shop turnings, New York	12.00 to 12.50
Mach. shop turnings, Pittsburgh	13.50 to 14.00
Mch. shop turnings, eastern Pa.	14.50 to 15.00
Mch. shop turnings, Birmingham	8.50 to 9.00
R. R. and mch. cast, No. 1, Bfl.	24.00 to 24.50
R. R. wrought, No. 1, Buffalo	29.00 to 30.00
R. R. wrgt., No. 1, eastern Pa.	35.00 to 37.00
R. R. wrought, No. 1, Pittsburgh	28.00 to 30.00
R. R. wrought, No. 1, B'ham.	21.00 to 22.00
Wrought pipe, Buffalo	19.50 to 20.50
Wrought pipe, East Pa.	20.50 to 21.00
Wrought pipe, New York	18.50 to 19.00

(Net Tons)

Angle bars, iron, Chicago	$32.00 to 32.50
Angle bars, steel, St. Louis	24.50 to 24.75
Arch bars and transoms, St. L.	31.50 to 32.00
Arch bars and transoms, Chgo.	32.00 to 32.50
Busheling, No. 1, Chicago	18.25 to 18.75
Busheling, No. 1, Cincinnati	15.75 to 16.25
Busheling, No. 1, Cleveland	20.00 to 20.50
Busheling, No. 1, St. Louis	18.50 to 20.00
Busheling, No. 2, Chicago	13.00 to 13.50
Cast borings, Cincinnati	9.50 to 10.00
Cast borings, Cleveland	11.75 to 12.00
Cast borings, St. Louis	10.00 to 10.50
Cast borings, Chicago	10.00 to 10.50
Grate bars, Cleveland	15.25 to 15.75
Iron axles, St. Louis	38.00 to 39.00
Iron axles, Cleveland	43.00 to 44.00
Machine shop turnings, Chicago	9.50 to 10.00
Mach. shop turnings, Cleveland	10.75 to 11.00
Machine shop turn'gs, Cincinnati	9.50 to 10.00
Mach. shop turnings, St. Louis	10.50 to 11.00
Pipes and flues, Cleveland	17.00 to 18.00
Pipes and flues, Chicago	16.50 to 17.00
Pipes and flues, St. Louis	17.50 to 18.00
Railroad wrought, No. 1, Cleve.	26.00 to 27.00
Railroad wrought, No. 1, Chgo.	29.50 to 30.00
Railroad wrought, No. 1, Cinci.	21.25 to 22.00
Railroad wrought, No. 1, St. L.	29.50 to 30.00
Railroad wrought, No. 2, Chgo.	27.00 to 27.50
Railroad wrought, No. 2, St. L.	27.50 to 28.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$17.00 to 17.50
Axle turnings, Buffalo	18.00 to 18.50
Shafting, New York	28.50 to 29.00
Shafting, eastern Pa.	31.00 to 33.00
Steel car axles Birmingham	35.00 to 36.00
Steel car axles, New York	42.00 to 43.00
Steel car axles, Buffalo	45.00
Steel car axles, Cleveland	43.50 to 44.00
Steel car axles, Pittsburgh	43.00 to 48.00
Steel car axles, eastern Pa.	41.00 to 43.00

(Net Tons)

Shafting, St. Louis	26.00 to 26.50
Steel car axles, St. Louis	38.00 to 39.00
Steel car axles, Chicago	42.00 to 43.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pittsburgh	24.00 to 25.00
Car wheels, (steel), Pittsburgh	29.00 to 30.00
Car wheels, Chicago	22.00 to 22.50
Car wheels, eastern Pa.	25.50 to 26.00
Car wheels, Buffalo	24.00 to 24.50
Car wheels, New York	21.50 to 22.00
Car wheels, St. Louis	22.50 to 23.00
Car wheels, Birmingham	17.50 to 18.00
Car wheels, Cleveland	22.00 to 23.00
Cast, No. 1, N. J. points	24.50 to 25.00
Cast, No. 1, eastern Pa.	26.00 to 27.00
Cast, No. 1, Pittsburgh	23.50 to 24.00
Cast, No. 1, Birmingham	16.50 to 17.50
Malleable railroad, Cincinnati	13.50 to 14.00
Malleable railroad, Cleveland	22.50 to 23.00
Malleable railroad, Buffalo	24.00 to 24.50
Malleable railroad, Pittsburgh	21.50 to 22.50
Malleable railroad, eastern Pa.	19.50 to 20.50
Tram car wheels, Birmingham	16.50 to 17.00

(Net Tons)

Cast, No. 1, Chicago	20.00 to 20.50
Cast, No. 1, Cincinnati	19.25 to 19.75
Cast, No. 1, St. Louis	19.25 to 19.75
Malleable railroad, Chicago	20.50 to 21.00
Malleable railroad, St. Louis	18.75 to 19.25
Malleable agricultural, Chicago	16.50 to 17.00
Malleable agricultural, St. Louis	17.50 to 18.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	30.00 to 32.00
Reroll. rails, 5 ft. & ov., Chgo.	31.50 to 32.00
Reroll. rails, 5 ft. & ov., E. Pa.	32.00 to 33.00
Reroll. rails, 5 ft. & ov., St. L.	31.50 to 32.50
Reroll. rails, 5 ft. or ov., Cleve.	22.00 to 22.50
Reroll. rails, 5 ft. or ov., Birm.	20.00 to 21.00

(Net Tons)

Boiler punchings, Chicago	23.50 to 24.00
Locomotive tires, Chicago	37.50 to 38.00
Locomotive tires, St. Louis	35.50 to 36.00

"Where-To-Buy"

A classified-by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶ Index to advertisements will give you page number of any advertiser and by referring to advertisement you can get full particulars about products.

ACCUMULATORS.
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Southwark Fdy. & Mch. Co., Philadelphia, Pa.
Tod, Wm., Youngstown, O.
United Engrg. & Fdy. Co., Pittsburgh, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

ACETYLENE IN CYLINDERS.
Linde Air Products Co., New York City.
Oxweld Acetylene Co., Chicago, Ill.
Prest-O-Lite Co., The, Indianapolis, Ind.

ADAMITE ROLLS.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

AEROPLANE WIRE, STRAND AND CORD.
American Steel & Wire Co., Chicago, Ill.
Roebling's, John A., Sons Co., Trenton, N. J.

AIR SEPARATORS.
Raymond Bros. Impact Pulverizer Co., The, Chicago, Ill.

ALLOYS.
American Vanadium Co., Pittsburgh, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Blackwell, Geo. G., Sons & Co., Ltd., Liverpool, Eng.
Bourne-Fuller Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Central Steel Co., The, Massillon, O.
Haynes Stellite Co., The, Kokomo, Ind.
Standard Alloys Company, Pittsburgh, Pa.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
United Alloys Steel Corp., The, Canton, O.

ALUMINUM (Granulated).
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM (Solder).
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM (Vanadium).
American Vanadium Co., Pittsburgh, Pa.

ALUMINUM ALLOYS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM INGOTS.
United Smelt'g & Alum. Co., New Haven, Ct.

ALUMINUM RODS (Sheet).
United Smelt'g & Alum. Co., New Haven, Ct.

ANGLES, TEES, CHANNELS (See Steel, Structural).

ANNEALERS (Pot and Muffle).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

ANNEALING BOXES AND POTS.
Blackwood Steel Fdy. Co., The, Springfield, O.
Garwood Bronze & Iron Works, Garwood, N. J.
Knox Pressed & Welded Steel Co., Pittsburgh.
Mesta Machine Co., Pittsburgh, Pa.
Pittsburgh Annealing Box Co., Pittsburgh, Pa.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Pittsburgh Valve Foundry & Const. Co., Pittsburgh, Pa.
Swedish Crucible Steel Co., Detroit, Mich.
United Engrg. & Foundry Co., Pittsburgh, Pa.
Zanesville Malleable Iron Co., Zanesville, O.

ANTI-SLIP TREADS FOR STAIRS.
Pittsburgh Iron & Steel Foundries Co., Pittsburgh, Pa.

ARCHITECTURAL SHAPES.
Empire Art Metal Co., College Pt., N. Y.

ARMATURES.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

ASH BUCKETS.
Lakewood Engrg. Co., Cleveland, O.

AUTO TOWING CABLES.
American Steel & Wire Co., Chicago, Ill.

AUTO TRUCKS.
Federal Motor Truck Co., Detroit, Mich.

AXLES.
American Bridge Co., New York City.
American Steel Export Co., New York City.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Co., Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Illinois Steel Co., Chicago, Ill.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.

AXLE LATHES.
Bridgeford Mch. Tool Wks., Rochester, N. Y.

BABBITT METAL.
Keystone Bronze Co., Pittsburgh, Pa.
Lubricating Metal Co., The, New York City.
Ryerson, Jos., T., & Son, Chicago, Ill.

BAKERS, WIRE COATING.
Morgan Construction Co., Worcester, Mass.

BAKERS (Wire Coating and Bluing).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BALE TIES.
American Steel & Wire Co., Chicago, Ill.

BALLS (Brass and Bronze).
Auburn Ball Bearing Co., Rochester, N. Y.

BALLS (Steel).
Auburn Ball Bearing Co., Rochester, N. Y.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.

BANDERS (Hydraulic for Projectiles).
Southwark Foundry & Mch. Co., Philadelphia.
West Tire Setter Co., The, Rochester, N. Y.

BAND (Steel).
Akron-Selle Co., The, Akron, O.
Carnegie Steel Co., Pittsburgh, Pa.
Interstate Iron & Steel Co., Chicago, Ill.

BARBED WIRE FENCE (Equipment).
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

BARGES (Steel).
American Bridge Co., New York City.

BARS (Concrete Reinforcing).
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Ryerson, Jos. T., & Son, Chicago, Ill.
Trussed Concrete Steel Co., Detroit, Mich.
Upson Nut Co., Cleveland, O.

BARS (Iron and Steel).
American Bridge Co., New York, N. Y.
American Iron & Steel Mfg. Co., Lebanon, Pa.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bethlehem Steel Co., The, So. Bethlehem, Pa.
Bingham, W., Co., The, Cleveland, O.
Bourne-Fuller Co., Cleveland, O.
Brown-Wales Co., Boston, Mass.
Cambria Steel Co., Philadelphia, Pa.
Camden Forge Company, Camden, N. J.
Carnegie Steel Co., Pittsburgh, Pa.
Cincinnati Iron & Steel Co., Cincinnati, O.
Franklin Steel Works, Franklin, Pa.
Harvey, Arthur C., Co., Boston, Mass.
Illinois Steel Co., Chicago, Ill.
Illinois Steel Co., Warehouse Dept., Chicago.
Illinois Steel Warehouse Co., St. Louis, Mo.
Illinois Steel Warehouse Co., St. Paul, Minn.
Inland Steel Co., Chicago, Ill.
Interstate Iron & Steel Co., Chicago, Ill.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Buffalo, N. Y.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Milton Mfg. Co., Milton, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Standard Gauge Steel Co., Beaver Falls, Pa.
Tennessee Coal, Iron & R. R. Co., Birmingham, Ala.
Trussed Concrete Steel Co., Detroit, Mich.
United Alloys Steel Corp., The, Canton, O.
Upson Nut Co., Cleveland, O.
Westerman & Co., Lockport, N. Y.

BARS (Tin).
Andrews Steel Co., Newport, Ky.

BEAMS, CHANNELS AND ANGLES.
American Steel Export Co., New York City.
Belmont Iron Works, Philadelphia, Pa.
Bourne-Fuller Co., Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Empire Art Metal Co., College Pt., N. Y.
Franklin Steel Works, Franklin, Pa.
Illinois Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.

BEARINGS (Ball).
Auburn Ball Bearing Co., Rochester, N. Y.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Ball Thrust).
Auburn Ball Bearing Co., Rochester, N. Y.

BEARINGS (Vanadium Steel).
American Vanadium Co., The, Pittsburgh, Pa.

BELT CEMENT AND DRESSING.
Dixon, Jos., Crucible Co., Jersey City, N. J.
Graton & Knight Mfg. Co., Worcester, Mass.
Texas Company, The, New York City.

BELT LACING (Leather).
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BELTING (Chain).
Link-Belt Company, Chicago, Ill.

BELTING (Leather).
Bingham, W., Co., The, Cleveland, O.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Graton & Knight Mfg. Co., Worcester, Mass.

BENCHES (Steel).
New Britain Mach. Co., New Britain, Conn.

BENCHES AND FRAMES (Drawing).
Morgan Construction Co., Worcester, Mass.
Turner, Vaughn & Taylor Co., The, Cuyahoga Falls, O.

BENDING AND STRAIGHTENING MACHINES.
Abramsen Engrg. Co., Pittsburgh, Pa.
Bertsch & Co., Cambridge City, Ind.
Birdsboro St'l Fdy. & Mch. Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Espen-Lucas Machine Works, Philadelphia, Pa.
Hinman, D. A., & Co., Sandwich, Ill.
Lourie Mfg. Co., Springfield, Ill.
Mackintosh, Hemphill & Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Niles-Bement-Pond Co., New York, N. Y.
United Engrg. & Fdy. Co., Pittsburgh, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above